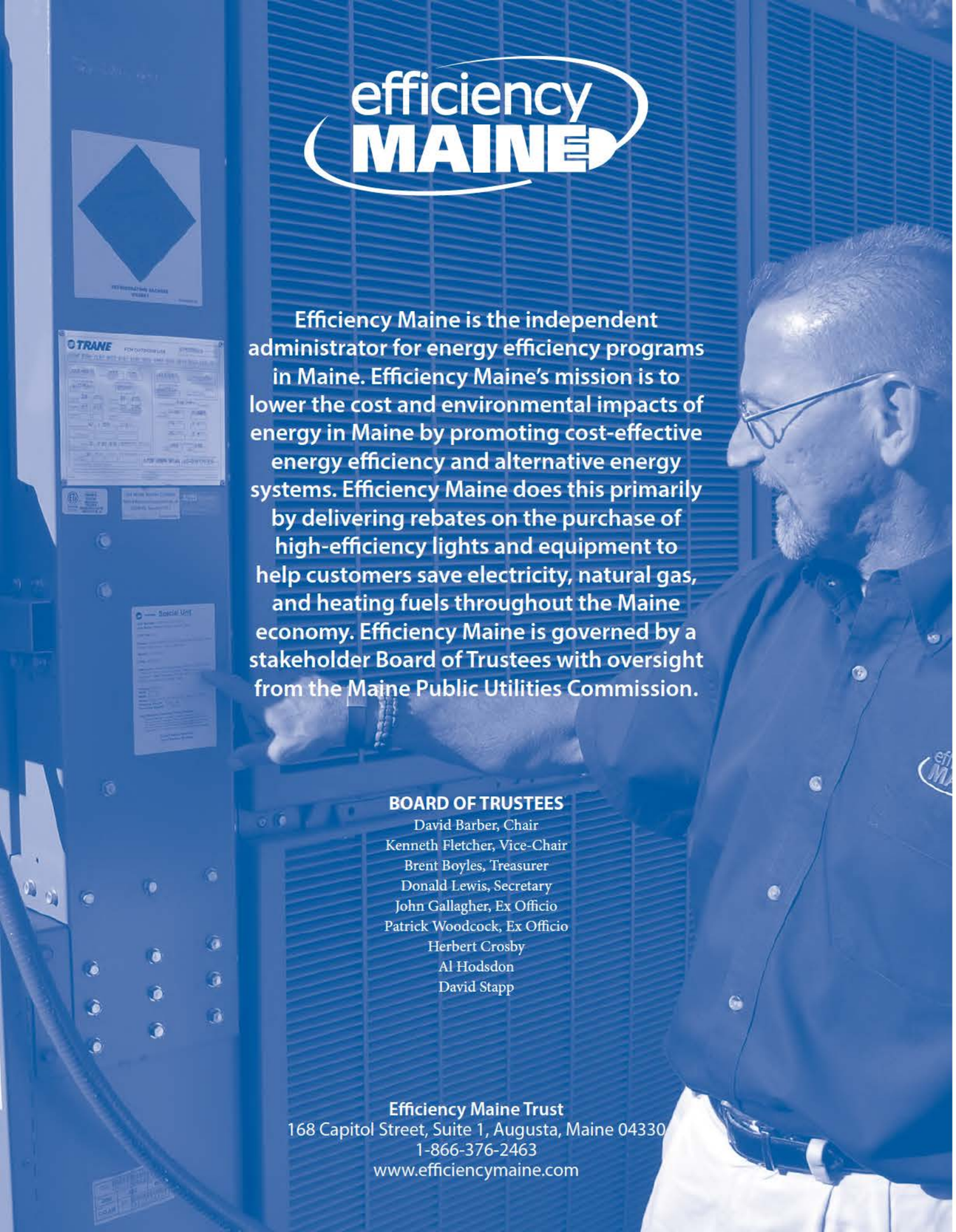
MAINE STATE LEGISLATURE

FY2016 ANNUAL REPORT






efficiency MAINE

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ABBREVIATIONS/ACRONYMS

AESC	Avoided Energy Supply Costs
AMP	Arrearage Management Program
BIP	Business Incentive Program
C&I	Commercial and Industrial
CAA	Community Action Agency
CEO	Chief Executive Officer
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
CTO	Chief Technology Officer
DHP	Ductless Heat Pump
DIY	Do-It-Yourself
DR	Demand Response
EISA	Energy Independence and Security Act
EM&V	Evaluation, Measurement, and Verification
FCA	Forward Capacity Auction
FCM	Forward Capacity Market
FERC	Federal Energy Regulatory Commission
FY	Fiscal Year (July 1 - June 30)
GHG	Greenhouse Gas
HESP	Home Energy Savings Program
HPWH	Heat Pump Water Heater
ISO-NE	Independent System Operator for New England
kWh	Kilowatt-hour
LED	Light-Emitting Diode
LIDI	Low-Income Direct Install
LIHEAP	Low-Income Home Energy Assistance Program
LIHESP	Low-Income Home Energy Savings Program
LIWx	Low-Income Weatherization
MAB	Maine Advanced Building Program
MACE	Maximum Achievable Cost-Effective
MEP	Multifamily Efficiency Program
MMBtu	Million British Thermal Units
MPRP	Maine Power Reliability Program
MYSF	Maine Yankee Settlement Fund
NBI	New Buildings Institute
PACT	Program Administrator Cost Test
PACE	Property-Assessed Clean Energy
PUC	Public Utilities Commission
PWD	Public Works Department
QP	Qualified Partner
RFI	Request for Information
RFP	Request for Proposal
RGGI	Regional Greenhouse Gas Initiative
RKO	Runyon, Kersteen, Ouellette, Inc.
SBI	Small Business Initiative
SGS	Small General Service
T&ST	Transmission or Sub-Transmission
TA	Technical Assistance
TCR	Tabors Caramanis Rudkevich
TRC	Total Resource Cost
TRM	Technical Reference Manual

Message From The Executive Director

MICHAEL D. STODDARD

The Efficiency Maine Trust focused on two main themes in Fiscal Year 2016 (FY2016): promoting and implementing steady, continuous improvement to our program offerings and developing a new, strategic plan for the next three years of energy efficiency programs in Maine.

The Efficiency Maine Trust (the Trust) made numerous enhancements during FY2016 to improve our programs. We extended the availability of our natural gas conservation programs to all four gas utilities in the state, including Bangor Natural Gas, Maine Natural Gas, and Summit Natural Gas of Maine,[1] whereas previous state law had limited these programs to serve only customers in the Unitil territory. The Trust spent considerable effort in FY2016 reaching out to inform and educate these natural gas customers about the energy efficiency opportunities available to them and the procedures for receiving incentives.

The Trust also expanded our offerings for low-income customers. To help low-income Mainers stay warm and lower their heating bills, the Trust launched the Low-Income Home Energy Savings Program, which provides enhanced incentives to weatherization and heating measures and reduced customer co-pays. The Trust also collaborated with the Public Utilities Commission (PUC), the Office of the Public Advocate, and the state's electric utilities to launch the Arrearage Management Program for low-income customers who are behind on their electricity bills. Under that program, the Trust offers analysis and advice to customers about ways to reduce household electricity consumption through energy efficiency and conservation measures.

In addition to these new programs, the Trust expanded offerings in the Commercial and Industrial (C&I) sector. More types of heating systems and controls were added to the Business Incentive Program, and the Large Custom Program broadened its range of eligible projects to include mid-sized custom projects that, we hope, will be attractive to an increasing number of C&I customers.

Finally, the Trust made a variety of other improvements in our outreach to Maine's residential customers. For example, we made a successful connection with tribal communities, where cold-climate heat pumps are now delivering efficient, affordable heat. Additionally, we made improvements in how we use the internet to promote home weatherization. Our use of targeted online advertisements has extended our reach and improved the efficacy of our messages. We also used social media platforms like Facebook to share information and best practices and to foster conversations across our communities that are inspiring Maine customers to jump on the efficiency bandwagon.

The Trust implements its programs pursuant to a strategic plan that is developed through a collaborative stakeholder process, approved by the Trust's Board of Trustees, and subsequently by the PUC. This plan is updated every three years, and is referred to as the "triennial plan." A major accomplishment of the Trust in FY2016 was developing and securing approval of Triennial Plan III, which will cover programs in FY2017, FY2018, and FY2019.

Development of Triennial Plan III began with research and analysis. The Trust commissioned a study of avoided energy supply costs, in collaboration with energy efficiency programs in the other New England states, to determine the value of each unit of electricity, gas, or oil saved through the Trust's proposed programs. We also commissioned baseline studies for the residential and C&I sectors of the Maine economy. The baseline studies describe the status of existing buildings and equipment in Maine that allows us to estimate where there will be opportunities to save energy and to project how large those opportunities will be. Among the many interesting findings of the baseline studies, we learned that Maine homes, on average, allow cold air in and leak warm air out at a rate that is 47% worse than homes in Vermont, and approximately 90% of lights in Maine's C&I facilities are not fitted with controls. From the baseline study, the Trust developed an estimate of the maximum achievable potential for cost-effective savings in the state. We estimated the number of LED lights, high-efficiency furnaces, heat pumps, insulation projects, and combined heat and power (CHP) units that could realistically and economically be installed in the next decade. We then worked with a broad array of stakeholders, including paper mills, the Office of the Public Advocate, electrical and weatherization contractors, utilities, small businesses, and environmental groups, to develop a detailed plan for the next three years. The result, Triennial Plan III, was unanimously approved by the Trust's Board and then the PUC to put an exclamation point on the end of a very busy year.

The end of FY2016 also marked completion of six years of program implementation since the inception of the Trust. It's worth pausing to take stock of what has been accomplished. The cumulative impact of those programs, starting from the first triennial plan and extending through the second, reduced annual electricity consumption by 1.1 billion kWh and reduced peak summer demand on the grid by 117.2 MW in the sixth year. By the sixth year, this conservation resource constituted 9% of Maine's total load and 5% of its generation capacity needs. Together with 980,000 MMBtu of reduced natural gas, oil, and propane use, these programs cut greenhouse gas emissions by more than 643,000 tons — the equivalent of taking roughly 135,400 cars off the road. Economically, these programs have lowered energy bills for Maine's homes and businesses by hundreds of millions of dollars each year.

We feel privileged to manage these programs for the benefit of Maine's energy consumers and to work with the vendors and contractors serving them. We appreciate your interest in the results of last year's work, and hope you will join us in working to make Maine the most energy-efficient state that it can be.

1 Residential customers of Summit Natural Gas of Maine received conservation incentives paid through a separate rate negotiated by the utility.

Introduction

The Annual Report of the Efficiency Maine Trust ("the Trust" or "Efficiency Maine") describes activities during Fiscal Year 2016 (FY2016), which covered the period from July 1, 2015 to June 30, 2016. It includes the budgets, activities, and results for all programs and related activities administered by the Trust during FY2016. In total, these programs generated more than 2.3 billion kWh and nearly 4.9 million MMBtu in cost-effective lifetime energy savings for Maine ratepayers.

Some noteworthy highlights of the Trust's FY2016 programs include:

- Avoiding more than $300 million in unnecessary energy costs
- Matching more than $80.9 million of incremental private investment with $43.7 million of program investment
- Expanding low-income initiatives, including launching of the Low-Income Home Energy Savings Program (LIHESP) and the Arrearage Management Program (AMP)
- Supporting 8,283 projects to install air sealing, insulation, ductless heat pumps, and heating systems through the Home Energy Savings Program (HESP)
- Expanding thermal efficiency measures for the commercial and industrial sector, including efficiency measures for all natural gas territories
- Reaching peak summer demand reduction on the grid of 28.4 MW
- Expanding combined heat and power and custom energy-saving opportunities for the commercial and industrial sector
- Avoiding 119,000 tons of greenhouse gas emissions

The Trust was created by state statute in 2009.[2] The purposes of the Trust include:

- Consolidating under one roof the funds for Maine's consumer efficiency programs for all fuel types—electric, natural gas, heating oil, and wood—together with consumer alternative energy programs;
- Integrating delivery of electric and thermal efficiency measures so that the customer can have a one-stop shopping experience;
- Acquiring energy resources (efficiency and alternative energy) that cost less than traditional energy supply to help individuals and businesses meet their energy needs at the lowest cost; and
- Helping transform the energy market in Maine so that energy-efficient products, alternative energy equipment, and related energy services are more accessible and affordable to end-use customers.

2 Title 35-A, Maine Revised Statutes, Chapter 97.

The Trust is managed by a nine-member Board of Trustees. During FY2016, new trustees Herbert Crosby, Professor Emeritus of Mechanical Engineering Technology at the University of Maine in Orono, and David Stapp, Chief Executive Officer (CEO)/Chief Technology Officer (CTO) of Peregrine Turbine Technologies in Wiscasset, were appointed to the Board. David Barber, Senior Consultant and former President of Barber Foods, and Kenneth Fletcher, former Director of the Governor's Energy Office, served as Chair and Vice-Chair, respectively. Brent Boyles, former CEO of Maine Public Service, served as Treasurer, and Donald Lewis, President of Nyle Systems, served as Secretary. Al Hodsdon, owner of A.E. Hodsdon Engineers, also served. Ex officio members were Patrick Woodcock, Director of the Governor's Energy Office, and John Gallagher, Director of the Maine State Housing Authority (MaineHousing).

Sectors Served

The Trust continually streamlines and simplifies its programs for the benefit of program participants, and its programs and initiatives serve multiple sectors. Table 1 illustrates the sectors served by each Trust program.

Funding

The Trust receives funds from a variety of sources, including Maine ratepayers, the Regional Greenhouse Gas Initiative (RGGI), revenues from the Forward Capacity Market (FCM), and a long-term contract with Maine utilities. The Trust is directed by Maine statute to invest these funds to promote more efficient and affordable use of energy and customer-sited alternative energy systems. Table 2 depicts the funding sources for each program. The table is followed by brief descriptions of the funding sources and how they are invested through Efficiency Maine programs.

Electric Efficiency Procurement: This funding stream comes from payments made by the utilities directly to the Trust for the procurement of cost-effective energy efficiency. The amount of funding the Trust receives is determined by the budget needed to capture the maximum achievable cost-effective (MACE) energy efficiency potential approved by the Maine Public Utilities Commission (PUC). The Trust typically offsets some of the budget necessary to capture MACE potential through the use of other funding sources.

Maine's largest electric customers, who take service at the transmission or sub-transmission (T&ST) level, do not contribute to and are ineligible for funding from the Electric Efficiency Procurement.

Table 1: Sectors Served by Efficiency Maine Programs

Program	Commercial and Industrial	Small Business	Multifamily	Residential	Low-Income Households
Business Incentive Program	✓	✓	✓		
Large Custom Program	✓				
Maine Advanced Building Program	✓	✓			
Small Business Initiative		✓			
Renewable Energy Demonstration Grants Program	✓				
Consumer Products Program	✓	✓	✓	✓	✓
Multifamily Initiative	✓	✓	✓	✓	✓
Home Energy Savings Program			✓	✓	✓
Low-Income Initiatives					✓

Maine Yankee Settlement: The Maine Yankee Settlement Fund (MYSF) revenues stem from a settlement with the federal government for the storage of spent nuclear fuel. In FY2016, a portion of these funds were distributed through the Trust's programs. These funds were allocated to electricity-saving programs to supplement the revenues from the Electric Efficiency Procurement.

Natural Gas Efficiency Procurement: This funding stream comes from an assessment on natural gas local distribution companies. Similar to the standard used to establish the appropriate level of funding for electric efficiency, the amount of the assessment is based on the amount needed to capture all the cost-effective natural gas energy efficiency that is achievable and reliable.

Regional Greenhouse Gas Initiative: RGGI is a nine-state regional program to limit carbon emissions from electricity generators. Maine joined RGGI in 2009 when the program was established. Under the program, large generators are required to purchase "carbon allowances" in an amount equal to their carbon emissions. Allowances are sold at quarterly auctions for this purpose. In Maine, proceeds from the auctions are transferred to the RGGI Trust Fund managed by the Trust.

The Trust uses RGGI funds for energy conservation programs that reliably reduce electricity consumption or greenhouse gas (GHG) emissions. In FY2016, the Trust employed statutory guidelines for allocating RGGI funds: 1) 50% to efficiency investments that reduce electricity consumption or GHG emissions and that lower energy costs at commercial or industrial (C&I) facilities; 2) 35% to efficiency investments that lower residential heating energy demand and reduce GHG emissions;

Table 2: Program Funding Sources

Program	Electric Procurement	MYSF	Natural Gas Procurement	RGGI	MPRP	FCM	LTC	Federal/ Other	Renewable Resource Fund
Business Incentive Program	✓	✓	✓	✓	✓	✓		✓	
Large Custom Program	✓	✓	✓	✓	✓	✓	✓		
Maine Advanced Building Program				✓					
Small Business Initiative	✓								
Renewable Energy Demonstration Grants									✓
Consumer Products Program	✓	✓		✓	✓	✓			
Multifamily Initiative	✓		✓	✓					
Home Energy Savings Program	✓	✓	✓	✓	✓	✓			
Low-Income Initiatives	✓	✓	✓	✓	✓				

and 3) 15% to the PUC to be disbursed to electricity ratepayers. In the spring of FY2016, the Maine Legislature provided further direction on the allocation of RGGI investments: Beginning in FY2017, the Trust must allocate $3 million annually to the PUC to be disbursed to a group of "affected customers" in the C&I sector. The allocation of the remaining funds is to be 50% to the residential sector and 50% to the C&I sector.

Maine Power Reliability Program Settlement: The funds received by the Trust from the Maine Power Reliability Program (MPRP) Settlement are governed by a May 7, 2010, stipulation approved by the PUC. Under the stipulation, in FY2016, the Trust received $300,000 for the weatherization of low-income homes, $500,000 for efficiency projects for T&ST customers, and $700,000 for electrical efficiency projects at the Trust's discretion. In FY2016, the Trust allocated its discretionary funds equally to the Business Incentive Program and the Consumer Products Program.

Forward Capacity Market: FCM funds are proceeds from the Trust's capacity resource that is bid into the Independent System Operator for New England (ISO-NE) Markets. The compensation the Trust receives from the FCM is for the reduction of capacity provided through qualifying efficiency projects that are tracked and reported by the Trust.

Long-Term Contract: In October 2014, the PUC approved a long-term contract between the Trust and Maine's two investor-owned transmission and distribution utilities for the purchase and sale of energy efficiency capacity resources. The funds were directed to be awarded through the Large Custom Program and were required to be committed by June 30, 2015. Per the order approving the long-term contract, the Trust will submit annual reports to the PUC indicating the savings from each individual project funded by the contract.

Federal/Other: Federal funds form the core of the Trust's revolving loan funds. In addition, the Trust occasionally receives other grants or federal funds for specific projects.

Renewable Resource Fund: The Renewable Resource Fund is composed of voluntary contributions from ratepayers, as well as alternative compliance payments from entities that do not meet Maine's renewable portfolio standard requirement. Statute stipulates that 35% of these revenues be directed to the Maine Technology Institute to help promote research and development of renewables. Efficiency Maine may use the remainder to fund demonstration projects or, if there are sufficient funds, to provide rebates for customer-sited, commercialized renewable energy equipment.

Results

The programs administered by the Trust played a critical role in helping Maine businesses and homes take advantage of energy efficiency, educating consumers about products that save energy, and helping them connect with vendors and contractors. The Trust's programs provided financial incentives that spurred consumers to choose energy-efficient options over less-expensive, less-efficient options — a choice that will lower energy bills over the long term and put the Maine economy on a stronger footing. Table 3 and Table 4 illustrate the total energy savings and lifetime avoided energy costs associated with each of the programs administered by the Trust in FY2016.[3] Each table also shows the summary of the Trust's costs. These figures include the financial incentives given to customers ("participants") and the participants' incremental cost of the energy upgrades. The costs also factor in the Trust's efforts to manage the programs, provide public information and outreach, hold training sessions and provide technical support, and conduct quality control of each program. The benefit-to-cost ratio indicates the ratio of the financial benefits (from the lifetime avoided energy costs) to the costs of the Trust and the incremental costs of the participants. The Trust programs expanded in FY2016 to reach all natural gas customers and more low-income Mainers.[4] These new program offerings required more outreach and marketing than the Trust's longer-running, previously established programs and were subsequently not as cost-effective in FY2016. Nevertheless, they still achieved significant energy savings, got new initiatives up and running, and we expect improved cost effectiveness in subsequent program years.

3 The Trust's FY2016 Annual Report reflects the activities and results (including projected savings) of its FY2016 program activities. Following the practice of energy efficiency program administrators in the region, the Trust calculated lifetime benefits and avoided oil and gas values using price forecasts from what was then the most recently available edition of the Avoided Energy Supply Costs in New England Report (AESC Report). The most recently available edition of this report was published in April 2015. It used energy price forecasts from the 2014 U.S. Energy Information Administration (EIA) Annual Energy Outlook that were made at the end of 2014. Since then, energy prices have dropped. Readers are advised that updated price forecasts published recently in the 2015 U.S. EIA Annual Energy Outlook – Low Oil Price Scenario suggest that the lifetime value of oil savings may be as much as 11% lower than what the Trust is reporting here. Savings values reported in the program summary tables and individual program tables are "adjusted gross savings," unless otherwise indicated. Adjusted gross savings is the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted by factors developed through program evaluations. Periodically, Efficiency Maine enlists independent third-party contractors to evaluate the savings impacts of major programs. The evaluations develop factors to improve the accuracy of gross savings calculations based on installation rates and in situ-verified savings rates. The evaluations also analyze program attribution, including identifying program participants who would have installed the same or equivalent efficiency measures on their own even if the program had not been offered ("free-ridership") and the percentage of efficient equipment installed due to program influences even though no incentive or technical assistance was received ("spillover"). Factoring in free-ridership and spillover delivers "net savings," which quantifies the savings directly (adjusted gross – free-ridership) and indirectly (spillover) attributable to the program and is reported in Appendix A, Tables 28 and 29. Efficiency Maine publishes estimated free-ridership and spillover factors in the Technical Reference Manuals.

4 Residential customers of Summit Natural Gas of Maine received conservation incentives paid through a separate rate negotiated by the utility.

Table 3: Costs and Savings for Electric Programs

Program	Annual kWh Savings	Lifetime kWh Savings	Efficiency Maine Costs	Participant Costs	Lifetime Energy Benefit	Cost/kWh (Lifetime)	Benefit-to-Cost Ratio
Business Incentive Program Electric Measures	20,961,707	287,282,615	$7,028,734	$7,132,263	$27,557,961	$0.049	1.95
Large Customer Program Electric Measures	102,985,781	1,366,173,818	$6,597,108	$16,001,516	$73,570,796	$0.017	3.26
Small Business Initiative	1,237,832	16,091,810	$872,298	$712,066	$2,475,285	$0.098	1.56
Consumer Products Program	56,911,672	525,809,890	$12,895,561	$29,953,540	$111,696,259	$0.081	2.61
Home Energy Savings Program Electric Measures	9,249,035	166,482,630	$2,837,287	$888,660	$15,742,826	$0.022	4.23
Low-Income Direct Install Initiative Electric Measures	178,937	1,647,776	$137,634	$253	$163,769	$0.084	1.19
Arrearage Management Program	63,011	717,348	$115,669	$8,984	$112,396	$0.174	0.90
Strategic Initiatives—Electric			$762,878				
Administration—Electric			$2,123,597				
Total	**191,587,975**	**2,364,205,887**	**$33,370,766**	**$54,697,281**	**$231,319,292**	**$0.037**	**2.63**

Table 4: Costs and Savings for Thermal Programs

Program	Annual MMBtu Savings	Lifetime MMBtu Savings	Efficiency Maine Costs	Participant Costs	Lifetime Energy Benefit	Cost/MMBtu (Lifetime)	Benefit-to-Cost Ratio
Business Incentive Program Natural Gas Measures	64,484	1,129,729	$679,429	$951,337	$7,744,009	$1.41	4.86
Home Energy Savings Program Natural Gas Measures	5,356	124,424	$260,019	$1,074,794	$2,027,715	$10.73	1.52
Low-Income Direct Install Initiative Natural Gas Measures	791	12,990	$74,500	$0	$97,931	$5.73	1.31
Business Incentive Program Other Fuels Measures	24,013	418,180	$1,648,560	$2,979,440	$7,218,858	$11.07	1.56
Large Custom Program Thermal Measures	90,749	1,203,839	$1,879,472	$4,132,517	$19,000,234	$4.99	3.16
Maine Advanced Building Program	623	12,462	$134,136	$59,514	$186,173	$15.54	0.96
Home Energy Savings Program Other Fuels Measures	79,878	1,855,554	$4,096,936	$16,028,541	$30,239,569	$10.85	1.50
Low-Income Direct Install Initiative Other Fuels Measures	6,058	109,041	$699,988	$975,580	$2,454,693	$15.37	1.46
Low-Income Home Energy Savings Program	502	10,101	$52,094	$41,735	$148,703	$9.29	1.58
Renewable Energy Demonstration Grants Program			$146,749				
Strategic Initiatives—Thermal			$48,025				
Administration—Thermal			$584,881				
Total	**272,452**	**4,876,321**	**$10,304,789**	**$26,207,457**	**$69,117,886**	**$7.49**	**1.89**

Table 5: FY2016 Payments Made[5]

Use of Funds	Amount $
Administration—General	**2,173,942**
Residential Programs	**22,219,331**
Administration—Residential Programs	234,462
Low-Income	3,185,855
Non-Low-Income	18,799,014
Business Programs	**19,936,486**
Administration—Business Programs	242,321
Small/Medium	11,022,661
Large	8,671,504
Cross-Cutting and Alternative Strategies	**1,022,448**
Administration—Cross-Cutting Programs	173,131
Education and Awareness	27,184
Alternative Energy Program	146,749
Evaluation	675,384
Innovation	-
Other Payments	**2,506,157**
Total	**47,858,364**

As discussed in the "Finance and Administration" section of this report, the Trust invested more than $47 million in FY2016 to fund the programs described above.

Table 5 provides a summary of the Trust's payments during FY2016.

The following sections of the Annual Report provide a short description of each of the programs referenced in Table 3 and Table 4. Each description generally includes a statement of the main purpose of the program, a brief explanation of the activities undertaken to implement the program, and a summary of any quantifiable results.

5 The financial data reported in Table 5 are slightly different from that in Table 3 and Table 4 due to differences in accruals. Table 3 and Table 4 are based on project completion dates, while Table 5 is based on accounting principles.

Commercial and Industrial Sector

The following section of the Annual Report provides a short description of Efficiency Maine's programs that serve the commercial and industrial (C&I) sector. Each description generally includes a statement of the main purpose of the program, a brief explanation of the activities undertaken to implement the program, and a summary of any quantifiable results.

Business Incentive Program

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Large Custom Program

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Maine Advanced Building Program

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Small Business Initiative

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Renewable Energy Demonstration Grants Program

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Business Incentive Program

The Business Incentive Program (BIP) is characterized principally by its use of a "prescriptive approach" to promote the most common energy efficiency measures for commercial and industrial (C&I) sector customers. This approach offers fixed-price financial incentives for a predefined list of "off-the-shelf," widely available measures. Eligible measures represent significant energy-saving opportunities and have practical applications across the state and in commercial, industrial, nonprofit, and institutional settings.

Sectors Served

- Commercial and Industrial
- Small Business
- Multifamily (≥5 units)

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market
- Federal/Other

FY2016 Activities

In late FY2015, the Program expanded the availability of heating solutions to include equipment and controls of all fuel types, ranging from propane boilers to oil furnaces to boiler controls. At that time, eligibility for natural gas customers also expanded: C&I customers of all four of Maine's natural gas utilities (Bangor Natural Gas, Maine Natural Gas, Summit Natural Gas of Maine, and Unitil Natural Gas) became eligible for natural gas incentives, whereas previously only Unitil customers had been eligible. In FY2016, the Trust focused its outreach and marketing efforts on these new heating measures, partnering with natural gas utilities to educate customers, utility sales staff, and heating contractors. This partnership was critical, as the moment of initial sign-up and installation on the gas network is an ideal time to install high-efficiency equipment. Using Regional Greenhouse Gas Initiative (RGGI) funds, the Program continued to promote a popular measure: ductless heat pumps (DHPs). Nearly 900 were installed in FY2016.

The Program also focused its efforts on sharing incentive information with heating contractors across the state through outreach events, counter hours at distributors, educational workshops, and more. These efforts expanded the Qualified Partner (QP) network to more than 700 contractors and vendors representing more than 500 companies. Over the course of the year, QPs identified potential customers, developed project opportunities, and submitted electronic applications. The independent QPs are the Program's primary marketers, working with their current customers and identifying new customers for energy-efficient equipment installations. The Program communicates with the QPs through a dedicated website, an electronic newsletter, monthly webinars, and in-person meetings.

As reported in the FY2015 Annual Report, the third and fourth quarters of FY2015 experienced a surge of applications for incentives when a significant number of businesses applied for LED lighting upgrades. The Program's budget allocation for electricity measures was fully committed. At that time, the Trust stopped accepting any new applications seeking incentives for lighting and other electrical efficiency projects. In FY2016, electric conservation funds were invested in funding the projects that had been reserved and/or preapproved in FY2015. The suspension lasted for the first 11 months of FY2016; no new electricity-saving applications were accepted during that period.

FY2016 Results

In FY2016, 2,321 thermal measures, including 468 high-efficiency heating systems, were incentivized through BIP. All told, these measures will result in more than 1.5 million MMBtu of lifetime energy savings, roughly the equivalent energy required to heat 14,000 homes for one year. In addition to the energy savings realized, participating businesses will enjoy reduced maintenance costs, increased productivity, and other benefits.

The 54,540 lighting and other electricity-saving measures installed in FY2016 will result in more than 287 million kWh of lifetime energy savings. Many of these measures had a high coincidence with times of peak energy demand. These measures will reduce summer peak demand by 2,750 kW and will have a positive impact on reducing energy prices during these high-demand periods.

FY2016 Analysis

The Program offered a diversity of heating measures and increased participation: Business owners and contractors were both able to select the best solution from a long list of potential high-efficiency options. In FY2016, the Trust and participating contractors were able to market heating solutions more broadly. Installation of energy-efficient heating measures, specifically heat pumps, was steady throughout the year.

The Program successfully launched new natural gas incentives for the benefit of C&I customers in Bangor Natural Gas, Maine Natural Gas, and Summit Natural Gas of Maine territories to complement the existing programs offered to Unitil's C&I customers. The Program collaborated with these utilities to share information about incentives with customers and local contractors. The conservation

Table 6: Business Incentive Program Electric Results

Metric	Value
Total Participants	991
Total Projects	1,182
Annual kWh Savings	20,961,707
Lifetime kWh Savings	287,282,615
Efficiency Maine Costs	$7,028,734
Participant Costs	$7,132,263
Lifetime Energy Benefit	$27,557,961
Benefit-to-Cost Ratio	1.95

Table 7: Business Incentive Program Thermal Results[6]

Metric	Natural Gas (Value)	Other Fuels (Value)
Total Participants	50	84
Total Projects	60	2,322
Annual MMBtu Savings	64,484	24,013
Lifetime MMBtu Savings	1,129,729	418,180
Efficiency Maine Costs	$679,429	$1,648,560
Participant Costs	$915,337	$2,979,440
Lifetime Energy Benefit	$7,744,009	$7,218,858
Benefit-to-Cost Ratio	4.86	1.56

6 Due to its approach to accounting for program costs and benefits of multifamily energy efficiency projects, the Trust has included the results of multifamily activity in BIP in Table 7. However, the description and analysis of the activities from the multifamily effort are reported in the section on the Multifamily Initiative.

funds in each of the three new utility territories were almost fully invested through the installation of new, high-efficiency heating systems, while in Unitil territory the Program experienced greater challenges. The Program attributed these challenges to the fact that more of Unitil's commercial customers are long-established natural gas customers who do not find themselves in the market to upgrade their gas-fired heating equipment until the existing units reach the end of their useful lives. The majority of Unitil natural gas conservation funds were invested in custom projects identified at the utility's largest energy consumers.

A significant number of electrical efficiency projects, in particular lighting projects, were also installed in FY2016. But the suspension of accepting new applications, which started at the end of FY2015 and extended through the first 11 months of FY2016, clearly disrupted the energy efficiency marketplace. This phenomenon spilled over into other non-electric initiatives, leading many customers and contractors to mistakenly believe that the gas and other fuels measures of BIP were also "shut down."

Over the course of the year, Trust staff developed program and project management changes for FY2017 in response to lessons learned from the surge in interest in lighting measures that was experienced in FY2015. Incentive levels and product costs will be monitored more frequently, and incentive levels will be modified as often as quarterly to ensure that the Program and incentive levels stay abreast of market shifts. Incentives will now be more carefully tailored to reflect variation in product types and sizes, ensuring that incentive levels more accurately reflect measure costs. The Trust will also implement shorter deadlines for project completion, ensuring that Program funds cannot be tied up for significant periods of time for projects that may or may not be completed. The QP network provided input on these and other Program changes for FY2017, and the ongoing feedback from the contractor community continues to result in Program improvements and innovations.

The Business Incentive Program expanded its offerings to include new heating solutions and extended eligibility to customers in all four natural gas utilities. Efficiency Maine team members met with distributors and heating contractors across the state to get the word out about these changes and promote the full suite of measures.

Business Incentive Program

FY2017 Plans

The Program will continue its focus on heating measures. Natural gas conservation budgets will increase in FY2017; outreach to natural gas customers will be a priority to fully invest those funds. The Trust plans to collaborate with natural gas utilities for ongoing customer identification and education and to target specific sectors with significant natural gas-saving opportunities. For example, restaurants and institutional kitchens have energy-saving opportunities through upgrading to higher-efficiency cooking equipment. The Trust will target those customers and other sectors with customized energy-saving information. The Trust will also continue ongoing outreach to heating contractors and distributors to ensure potential customers are aware of energy efficiency opportunities.

Lighting measures in FY2017 will exclusively incentivize LED technology. LEDs are easily controlled and require less maintenance than fluorescents and other, older lighting technologies. The popularity of LED incentives in FY2015 demonstrated that there is significant customer demand for LEDs when incentives are available to offset the high initial cost. Because of the high efficacy of LEDs and their ability to be controlled, some businesses will be able to avoid a one-to-one replacement of old fixtures with LEDs. With this in mind, some incentives will be tied to lighting design or lighting power density calculations to ensure maximum energy savings.

In FY2017, the C&I Custom Program (referred to during FY2016 as the Large Custom Program) will be expanded to handle custom energy efficiency projects of all sizes, and smaller custom projects will no longer be handled through BIP. To make the distinction between custom and prescriptive projects clearer, in FY2017, BIP will be renamed the C&I Prescriptive Incentive Program.

Large Custom Program

The Large Custom Program includes energy efficiency projects involving site-specific applications that require unique engineering analyses and/or projects with energy conservation measures that are not covered in the prescriptive incentive offerings in BIP. The Large Custom Program is designed to overcome the barriers confronting Maine's businesses and institutions when making investments in complex or site-specific energy efficiency and distributed generation projects. These projects enable participating customers to make important facility improvements that help keep operating costs down for Maine's largest manufacturers and institutions.

Sectors Served

- Commercial and Industrial

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market
- Long-Term Contract

FY2016 Activities

In FY2016, the Program focused on attracting a more diverse set of customers. To that end, Program Staff conducted targeted outreach to hospitals, assisted living facilities, schools, and other institutions. The Trust worked closely with key representative associations, such as the Maine Health Care Association, to identify opportunities in these types of facilities. The Program also sought out natural gas efficiency opportunities, as natural gas customers in some parts of the state became newly eligible for incentives in FY2016. Finally, the Program continued its outreach to large manufacturers and followed up with customers who had previously expressed interest in developing new complex projects at their facilities.

In anticipation of the launch of Triennial Plan III and the consolidation of all custom projects under one program, the Trust started an effort to reach out to medium-sized C&I customers in search of smaller custom projects at the end of the fiscal year. This effort included instituting a reduction in the minimum project incentive from $100,000 to $10,000.

In FY2016, the Trust continued to focus on its incremental approach to developing relationships with the largest energy users in the state. The approach was based on building on successful projects, rather than through pursuing expensive, comprehensive energy-planning processes. The Trust initiated contact with new customers with the goal of completing a single project that fit within the customer's budgeting process. As the customer was guided through the incentive process for an initial project, the Trust sought to identify additional opportunities that built off prior efficiency projects. The Trust has been successful with this phased approach throughout the Triennial Plan II period, and its intention is to broaden it in the Triennial Plan III period.

FY2016 Results

Table 8 and Table 9 show the results for the Large Custom Program in FY2016, separated into savings of electricity (measured in kWh) and savings of other energy (measured in MMBtu), most notably oil and natural gas. During FY2016, the Program completed 31 projects for a total lifetime savings of approximately 1.37 billion kWh and 1.2 million MMBtu. The savings resulted in a benefit-to-cost ratio of 3.26 for electric measures and 3.16 for thermal measures. Incentives paid by the Trust leveraged more than $20.1 million in incremental private investment.

FY2016 Analysis

Maine businesses in the Large Custom Program relied primarily on outside contractors and vendors to identify energy efficiency opportunities in FY2016. Most of these projects required site-specific engineering beyond what most energy contractors or vendors are willing to explore on speculation. Accordingly, the Trust targeted its customer outreach to overcome this lack of site-specific assessment and expertise by providing free scoping audits to identify projects.

In FY2016, the Program completed 14 scoping audits. One of these resulted in a more in-depth study and three resulted in large custom projects or referrals to BIP.[8]

Scoping audits identified 10,581 MWh and 3,933 MMBtu of annual energy savings. While the conversion rate of scoping audits to Technical Assistance (TA) studies and projects was low in FY2016, it represents a robust pipeline of potential projects for FY2017.

The Trust administered TA grants to support development of potential projects involving complex energy efficiency and distributed generation projects. The Program approved seven TA incentives over the course of the year, three of which led to full project implementation. This outcome represents a TA-to-project conversion rate of 43%. Of 16 studies completed during the past three fiscal years (FY2014, FY2015, and FY2016), 11 projects were approved for investment. This result represents an average TA-to-project conversion rate of 69%. The Trust anticipates that one more of these TA grantees will follow

Table 8: Large Custom Program Electric Results

Metric	Value
Total Participants	21
Total Projects	25
Annual kWh Savings	102,985,781
Lifetime kWh Savings	1,366,173,818
Efficiency Maine Costs	$6,597,108
Participant Costs	$16,001,516
Lifetime Energy Benefit	$73,570,796
Benefit-to-Cost Ratio	3.26

Table 9: Large Custom Program Thermal Results[7]

Metric	Value
Total Participants	6
Total Projects	6
Annual MMBtu Savings	90,749
Lifetime MMBtu Savings	1,203,839
Efficiency Maine Costs	$1,879,472
Participant Costs	$4,132,517
Lifetime Energy Benefit	$19,000,234
Benefit-to-Cost Ratio	3.16

7 This table includes both natural gas and other fuels results. These categories are not reported separately because natural gas funding comprised a modest share of the total costs and savings in the Large Custom Program. No single project was funded exclusively using natural gas funding; any natural gas efficiency project incentive was either paid for in full or partially supplemented with RGGI funding. **8** The costs and benefits of the energy upgrades processed through BIP are included in the results of that program.

through with a viable project installation application in FY2017, which would increase the conversion rate to 75%.

The number of projects resulting from scoping audits and TA studies suggests that the Program's approach of dedicating resources to those activities is both important and effective. The Program involves multi-year project planning and budgeting. In addition to empowering and encouraging customers to move forward with meaningful energy efficiency projects, scoping audits and TA studies can help customers reduce costs. Moreover, the Program scrutinizes the work of engineering firms and contractors, helping customers avoid inflated costs and unnecessary add-ons.

During FY2016, the Program completed 31 projects for a total lifetime savings of approximately 1.37 billion kWh and 1.2 million MMBtu.

With the help of incentives and technical assistance through Efficiency Maine's Large Custom Program, St. Mary's Health System installed a 150 kW Combined Heat and Power (CHP) unit for its assisted living facility in Lewiston. The system generates sufficient electricity to cover 75%-100% of the building's power demands, using waste heat to supply enough hot water for the laundry, kitchen, and residences. The project saves St. Mary's roughly $80,000 per year in avoided energy costs. Facilities Manager Scott Young (left) shows off the CHP unit's features to Efficiency Maine's Ian Burnes.

Large Custom Program

FY2017 Plans

The Program opens FY2017 with 43 potential projects in various stages of planning and execution. In FY2017, the Trust generally anticipates maintaining the Program strategy and activities consistent with what was done in FY2016. The Trust will place added emphasis, however, on targeting small custom projects at medium-sized C&I customers. The Trust will also focus on promoting combined heat and power (CHP) technology, which constituted the bulk of the custom opportunity identified in the Trust's recently completed Commercial Baseline Study.

Additionally, the Program will adjust to changes associated with LD 1398, "An Act to Reduce Electric Rates for Maine Businesses." This bill, passed in the Maine State Legislature in late FY2016, requires that for each of the next three years, $3 million in annual RGGI revenues be returned to a group of "Affected Customers" in the form of a disbursement. This refund will generally render "Affected Customers" ineligible for RGGI-funded energy efficiency incentives, except in cases where they apply the disbursement to a qualifying efficiency project.

In FY2017, the Trust will also change the name of the Program from the "Large Custom Program" to the "C&I Custom Program." This shift reflects the fact that the defining characteristic of the Program relates to developing and screening all custom projects above a certain minimum threshold size. It will expand the Program's eligibility beyond just the very largest projects to include medium and smaller custom projects exceeding the minimum threshold.

In addition to opening up the Program to smaller custom projects, the Trust will work to accommodate the potential for a small number of extremely large custom project proposals should such proposals be brought to the Program's attention. In the event that project proposals in FY2017 show potential for significant, cost-effective electricity savings but exceed the existing Program incentive limit of $1 million per project, the Trust may work with customers to bring a specific funding request to the Public Utilities Commission (PUC) to be considered for funding through a long-term capacity contract.

Maine Advanced Building Program

The Maine Advanced Building Program (MAB) provides a comprehensive framework to achieve significant energy savings in new construction or major renovation projects. MAB offers education and financial incentives to promote and encourage a whole building, integrated design approach. The Program provides an alternative to the often-used "design-build" approach. Incentives are provided for comprehensive energy design and savings rather than individual efficiency measures.

Sectors Served
- Commercial and Industrial
- Small Business

Funds Invested
- Regional Greenhouse Gas Initiative

FY2016 Activities

Similar to the projects of the Large Custom Program, it typically takes several years to bring high-performance building projects from initial plans to completion. At any one time, MAB is supporting building owners, architects, and construction teams at various phases of the design and construction process from conceptual drawings to air sealing assessments to the final walk-throughs. In FY2016, several buildings entered the program, others reached important interim milestones in the construction process, and two were completed.

In addition to supporting program participants at various stages of the new construction process, the Program focused marketing efforts on Maine's architectural and engineering community. This included outreach to architect and engineer professional associations, participation in professional events, and meetings with the primary architecture and engineering firms working in Maine. Architects and engineers, in turn, marketed the Program during project proposals and in initial conversations with clients. Most high-performance building projects must start at the earliest stages of conceptual design to meet energy standards. The Trust has found that the best way to be sure that the Program is "at the table" during the design phase of new construction projects is to promote it through the work of design professionals.

FY2016 Results

Two high-performance building projects begun in FY2015 were completed in FY2016. The Western Maine Medical Office Building, a 25,500 square foot facility in Norway, Maine, was completed in April 2016. The facility, which houses offices, treatment rooms, laboratory facilities, and more, is notable for its 98% efficient heating system and its integration of daylight into the lighting design. The building is projected to save 77,775 kWh and 175 MMBtu per year compared to a conventional building. The 10,900 square foot Gorham Police Station, also completed in FY2016, replaced an aging police facility. The new building provides much-needed office space, as well as a garage facility. The project is notable for its radiant heat flooring and for its integration of daylight into the lighting design. The building is estimated to save the town more than 33,000 kWh and 75 MMBtu per year over a conventional new building, and significantly more energy over the one it replaced. In total, these projects are projected to realize more than $186,000 in lifetime energy benefit.

Several projects that were begun in FY2016 are projected to be completed over the next two years, including a community center and two high school additions.

FY2016 Analysis

Many new buildings involve a long planning and construction timeline. MAB was relaunched at the end of FY2014, and has successfully grown the project pipeline since that time. Interest in the Program has increased as it has become more established and connected with more architectural and engineering firms. In addition, a rise in new construction in Maine has provided the Program with more opportunities to connect with potential participants. Long-term building owners like municipalities and institutions continued to be the most likely participants; however, the Program team continued to market the Program to a variety of ownership types.

In FY2016, the Program continued to use the Core Performance Guide standards set by the New Buildings Institute (NBI) to guide high-performance construction. Feedback from participating design teams and building owners indicated that these standards work well. The prescriptive pathway offers specific efficiency guidance on various building elements together with enough flexibility to ensure that building owners and project teams can accommodate design and performance preferences specific to their needs. This flexible approach helps keep more projects participating in the Program from their initiation through final construction.

Table 10: Maine Advanced Building Program Results[9]

Metric	Value
Total Participants	2
Total Projects	2
Annual MMBtu Savings	623
Lifetime MMBtu Savings	12,462
Efficiency Maine Costs	$134,136
Participant Costs	$59,514
Lifetime Energy Benefit	$186,173
Benefit-to-Cost Ratio	0.96

9 Because MAB projects span multiple fiscal years from inception to completion, some costs are incurred prior to the fiscal year in which the project is completed and the savings are claimed. The Efficiency Maine Costs line includes $576,413 in encumbered funds for future projects, while the savings claimed are only for those projects completed in FY2016. The disjunction between when costs are incurred and when savings are reported may, as in FY2016, result in a Program-wide benefit-to-cost ratio that does not accurately reflect the cost-effectiveness of the specific projects that were completed or those that have been committed to and will be completed in the following year. MAB has a robust pipeline of projects currently under way. Those projects are incurring costs for savings that will be claimed in future Annual Reports. As the program continues to grow and expand participation, fiscal year benefit-to-cost ratios will continue to reflect the lag between project inception and project completion.

Two high-performance building projects begun in FY2015 were completed in FY2016.

The Western Maine Medical Office Building (above) was one of two buildings completed through the Maine Advanced Building Program in FY2016. Below, Efficiency Maine team members Kristin Gill and Rick Meinking present the MAB plaque to Leslie Gammon, Director of Plant Operations, and Craig Piper, project architect with SMRT. The building is notable for its high-efficiency heating system and extensive use of daylighting.

Maine Advanced Building Program

FY2017 Plans

The Trust plans to continue marketing the current version of the Program and will explore new ways to boost interest in energy efficiency among Maine's construction and design community. This means that while the Program will continue to support projects adhering to the Tier 2 pathway of NBI's Core Performance, Staff will also promote projects striving to reach an even higher, Tier 3 efficiency standard. The first such Tier 3 project will serve as a pilot for subsequent tiered energy savings and tiered incentives through the Program. Additionally, multifamily buildings with five or more units (apartments) will be made eligible for program participation.

Small Business Initiative

The Small Business Initiative (SBI) delivers cost-effective efficiency retrofits directly to small businesses. Specifically, the Initiative combines local marketing, competitive product pricing, and contractor support with streamlined delivery to incentivize customers in targeted geographic areas. This approach is designed to overcome the unique barriers to energy efficiency that small businesses experience. These barriers include the lack of time and in-house expertise to analyze energy options, the relatively low priority contractors place on assessing opportunities at small businesses, and the perceived "hassle" of making arrangements to purchase and install upgraded equipment. This Initiative overcomes these barriers by bringing information and technical support to the customer's doorstep, offering enhanced financial incentives (compared to the incentives of BIP), and scheduling and executing energy upgrades using the direct install approach.

Sectors Served

- Small Business

Funds Invested

- Electric Efficiency Procurement

FY2016 Activities

In FY2016, SBI continued lighting retrofit installations in two regions launched in FY2015:

- Mechanic Falls, Norway, Oxford, Poland, and South Paris
- Fairfield, Oakland,Waterville, and Winslow

The Trust hosted in-person events to introduce area businesses to the Initiative. It also collaborated with local chambers of commerce, posted advertisements in local newspapers, and conducted other outreach efforts to raise awareness of and generate activity in the program. In FY2016, more electricians and lighting contractors participated in the Initiative in each region than in prior years. In leveraging a broader network of local contractors, the Initiative was able to reach more businesses at a faster pace. These included businesses that might be too small for a typical lighting retrofit sale, but large enough to have a relationship with an electrician or lighting contractor for repairs and replacements.

Interested customers in each targeted region received a site visit and lighting assessment by the participating local contractor(s) to determine eligibility and scope of work. This visit was followed by turnkey installation of approved measures by the contractor. Incentives from the Initiative were applied directly to the contractor's invoice, allowing the participating business to pay only the remaining portion of the project. This approach removed the barrier a customer often faces of fronting the full payment for an energy upgrade and then waiting for the incentive payment.

FY2016 Results

In total, 99 businesses participated in SBI in FY2016. The energy-saving projects installed are projected to reduce electricity consumption by a little more than 16 million kWh over the life of the projects. The average participating business will save approximately $2,500 a year on its electric bills at current rates. Importantly, the high-efficiency measures installed have a high coincidence with peak summer demand and will reduce that peak by 318 kW.

FY2016 Analysis

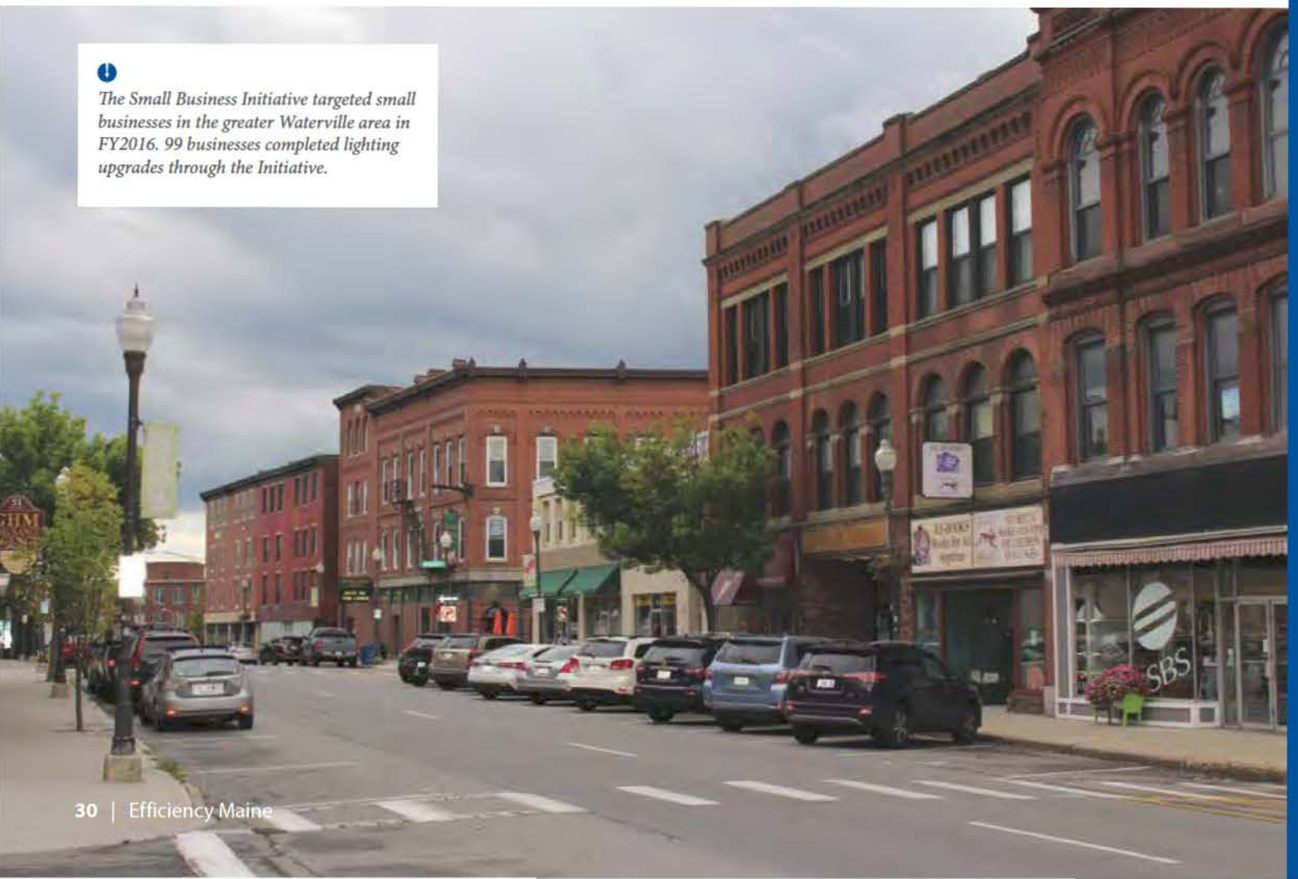
Participants reported that they would not have undertaken an efficiency project were it not for the turnkey process comprising an assessment, an installation, and a financial incentive. Business owners, whose payback periods were reduced by the Initiative's financial incentive to approximately one year, were able to justify the investment, even in situations where they were leasing commercial space. In both regions, the Initiative did not generate as much local "buzz" as was enjoyed in Aroostook County in FY2015. As the Initiative moves into new regions in FY2017, Staff will examine the mix of outreach efforts in an effort to recreate the interest level experienced in The County and to increase the Initiative's success.

The average size of participating businesses and completed projects was larger than expected in FY2016. In FY2017, the Trust will focus the Initiative on businesses under 25 kW in order to ensure that the direct install approach is serving the smallest businesses in Maine.

Table 11: Small Business Initiative Results

Metric	Value
Total Participants	99
Total Projects	110
Annual kWh Savings	1,237,832
Lifetime kWh Savings	16,091,810
Efficiency Maine Costs	$872,298
Participant Costs	$712,066
Lifetime Energy Benefit	$2,475,285
Benefit-to-Cost Ratio	1.56

The average participating business will save approximately $2,500 a year on its electric bills at current rates.



The Small Business Initiative targeted small businesses in the greater Waterville area in FY2016. 99 businesses completed lighting upgrades through the Initiative.

Small Business Initiative

FY2017 Plans

To better target the smallest "Main Street" businesses, the Initiative will shift eligibility criteria to Small General Service (SGS) business customers (i.e., businesses under 25 kW). This threshold will focus the Initiative on the businesses most in need of the turnkey approach and those likely to fall outside of traditional energy efficiency delivery models. With a larger FY2017 budget, the Initiative will need to target more eligible businesses to fully invest available funds. To do so, the Initiative will initially focus efforts on two large rural regions in FY2017: the Naples/Bridgton area and the Rt. 2 corridor from Bethel to Skowhegan.

As in the Consumer Products Program and BIP, SBI will transition to all LED lighting measures in FY2017. Incentivized measures will include both interior and exterior lights, many of which will reduce not only a business's energy costs, but also peak energy demand. In FY2017, the Trust will also evaluate adding measures, including heating solutions, through the SBI delivery model.

Renewable Energy Demonstration Grants Program

The Renewable Energy Demonstration Grants Program provides grants toward promotion, research, design, and demonstration of emerging clean energy technologies. The grants are funded by voluntary contributions from retail customers of electric utilities to the Renewable Resource Fund. Past projects have included solar hot air wall systems, biomass boilers, and district heating. Projects are selected through a competitive bidding process; grant awards are provided for applications of renewable energy technologies that demonstrate uses for renewable technologies and support community facilities.[10]

Sectors Served

- Commercial and Industrial (nonprofits and municipalities only)

Funds Invested

- Renewable Resource Fund

FY2016 Activities

As in FY2015, the Program did not issue any new requests for proposals (RFPs) for projects in FY2016, due to the limited revenues from the voluntary contributions. As a result, no grants were awarded for research and demonstration and no rebates were offered under this Program.

FY2016 did, however, see the completion of three projects that received demonstration grants in FY2014. Leveraging the $62,500 grant from the Trust, the City of Biddeford Public Works Department (PWD) installed a 3,200 square foot solar hot air panel array that provided more than 250 MMBtu toward the facility's space heating needs in its first season of operation. The project was completed in November 2015 and frequently provided all the heat needed to maintain minimum facility temperature requirements throughout the winter. The second project that was completed in FY2016 was a multi-year effort to promote the installation of pellet boilers in small businesses and municipal facilities in the area around Farmington and Wilton. The Trust also provided the Casco Bay Arena in Falmouth with a $50,000 grant toward installation of a 66 kW solar panel, projected to offset nearly 100% of the facility's annual electrical consumption. The project was completed in August 2015.

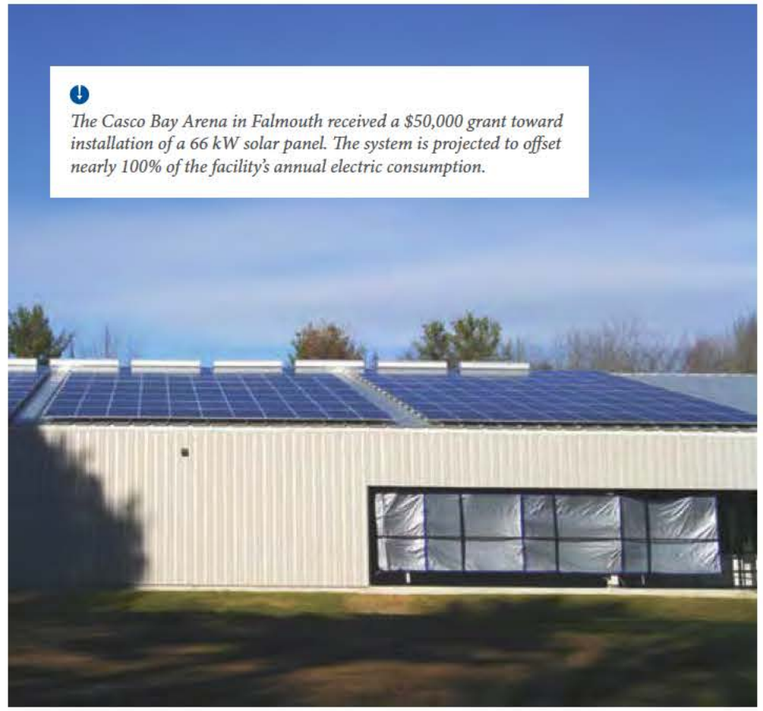
As required by statute, 35% of the Renewable Resource Fund revenues received during the year were passed through to the Maine Technology Institute to help promote businesses, whether nonprofit or for-profit, engaged in research and development of renewables.

FY2016 Results

The Trust does not record any savings associated with projects previously awarded through the Renewable Energy Demonstration Grants Program.

FY2016 Analysis

The Trust determined that FY2016 Renewable Resource Fund revenues were insufficient to conduct a meaningful procurement, and funds were held to be used for a larger competitive solicitation for proposals in FY2017.



The Casco Bay Arena in Falmouth received a $50,000 grant toward installation of a 66 kW solar panel. The system is projected to offset nearly 100% of the facility's annual electric consumption.

10 The cost-effectiveness of the Renewable Energy Demonstration Grants Program is determined using the Modified Participant Cost Test. This approach contrasts with all other Trust programs that determine cost-effectiveness using the Total Resource Cost test.

Renewable Energy Demonstration Grants Program

FY2017 Plans

The Trust plans to generate case studies and other information about the completed demonstration projects for posting on its website and other channels. Future revenues for the Renewable Resource Fund will be directed through competitive solicitations to community demonstration installations of renewable energy technologies and research and development projects. The Renewable Resource Fund received slightly more than $50,000 in total revenue in FY2015 and $77,000 in FY2016; an amount similar to the FY2016 revenues is forecast for FY2017. Thirty-five percent of the revenues, as directed by statute, will be passed through to the Maine Technology Institute to help promote research and development of renewables. With limited revenue, activities over the next year will be targeted to projects that will have the greatest impact on demonstrating the lowest-cost renewable energy options with the greatest end-user payback in community facilities. The Trust plans to issue an RFP in 2017 and award one or more grants by the close of FY2017.

Cross-Sector Initiatives

The following section of the Annual Report provides a short description of Efficiency Maine's programs that serve both the commercial and industrial (C&I) and the residential sectors. Each description generally includes a statement of the main purpose of the program, a brief explanation of the activities undertaken to implement the program, and a summary of any quantifiable results.

Consumer Products Program

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Multifamily Initiative

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Consumer Products Program

The Consumer Products Program focuses on energy-saving measures that sell in relatively high volumes and that, on average, achieve predictable energy savings. The Program leverages relationships with retailers and distributors of energy-efficient products to discount products on the shelf or to distribute rebate information at the point of purchase. This Program reaches the largest number of Maine customers; it also serves all sectors of the economy: commercial, industrial, and residential (including low-income) customers.

Sectors Served

- Commercial and Industrial
- Small Business
- Multifamily
- Residential
- Low-Income Households

Funds Invested

- Electric Efficiency Procurement
- Maine Yankee Settlement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market

FY2016 Activities

The Consumer Products Program discounted high-efficiency lights at major retailers and lighting distributors. In FY2016, the Program focused on introducing more LED products, in particular LED specialty bulbs. In the previous year, LED prices dropped significantly. This drop in price enabled the Program to incentivize more types of LED bulbs and more total units of LED bulbs than in years past. Incentives, combined with dropping prices, helped drive increased consumer demand for LED bulbs. In addition, the Program shifted away from specialty CFLs and, to target more consumers, added "value-line" LEDs. These LEDs have a shorter bulb life than ENERGY STAR® models, but are as efficient as and cost significantly less than ENERGY STAR® LEDs. By including value-line bulbs in the Program, the Trust was able to stretch incentive dollars further and discount significantly more high-efficiency LEDs than in the past.

The Program also targeted screw-in LED bulb purchases at lighting distributors. Many businesses and electrical contractors purchase bulbs at lighting distributors, for both commercial and residential installations. To capture the potential energy savings of screw-in bulbs purchased through this channel, the Program undertook significant direct outreach to distributors, providing training to sales staff and managers. The Program also provided in-store signage and information. This outreach effort was successful: A number of distributors added staff or encouraged sales staff to find businesses with significant screw-in LED lighting savings opportunities. The Program also distributed high-efficiency CFL bulbs free of charge at food pantries as part of the Low-Income Initiatives.

The Program provided mail-in rebates for the purchase of high-efficiency air purifiers, clothes washers, dehumidifiers, and heat pump water heaters. This blend of low- and high-price appliances enabled a significant number of Mainers to participate in the Program; indeed, the number of high-efficiency air purifiers incentivized through the Program exceeded expectations. However, the Program focused its marketing and outreach efforts on heat pump water heaters, given their energy-saving potential (heat pump water heaters have the potential for significant energy savings compared to electric resistance water heaters) and higher first costs. To capture more emergency water heater replacement purchases in retail locations, the Program created, distributed, and installed large in-store displays and in-store materials. The Program also increased trainings for sales associates and prioritized outreach to plumbers and installers to increase awareness of high-efficiency water heaters as an option.

FY2016 Results

Over the course of the year, the Program incentivized nearly 3 million high-efficiency bulbs, including more than 1.6 million LED bulbs, totaling roughly 459.3 million kWh of lifetime savings. More than 227,000 of those bulbs were incentivized through lighting distributors. Because most bulbs purchased through the distributor channel are installed in commercial settings, the value of the energy savings from those bulbs is estimated to be even greater because of their high coincidence with peak power periods and daily hours of use. High-efficiency screw-in bulbs in commercial settings are one of the biggest ways the Trust can reduce peak demand and reduce peak power prices. Indeed, bulbs installed in FY2016 are forecasted to reduce peak demand by 18.8 MW.

The Program also incentivized more than 1,600 room air purifiers, 2,600 clothes washers, 3,000 dehumidifiers, and 2,600 heat pump water heaters. All told, the energy savings from these high-efficiency bulbs and appliances will be over 525.8 million kWh over the life of the equipment. This is roughly the equivalent amount of electricity required to power more than 85,500 homes for one year.

FY2016 Analysis

The relatively low price point of bulbs, the easy access to product on store shelves throughout the year, and the high savings rate per dollar of investment have resulted in broad distribution of energy-saving benefits across all sectors and geographic areas of the state. Bulb discounts also result in significant energy savings, notwithstanding the reduction in calculated energy savings due to the phase-in of higher efficiency standards established in the Energy Independence and Security Act (EISA). In addition, the Trust took into account the interactive

Table 12: Consumer Products Program Results[11]

Metric	Value
Total Bulbs	2,982,131
Total Appliances	10,665
Annual kWh Savings	56,911,672
Lifetime kWh Savings	525,809,890
Efficiency Maine Costs	$12,895,561
Participant Costs	$29,953,540
Lifetime Energy Benefit	$111,696,259
Benefit-to-Cost Ratio	2.61

11 Due to its approach to accounting for program costs and benefits of distributing efficient lights through food pantries, the Trust has included the results of that activity in Table 12. However, the description and analysis of the activities from the food pantry effort are reported in the section on Low-Income Initiatives.

effect of lighting energy savings: High-efficiency lighting typically reduces cooling load where it is installed but also results in a modest increase of the heating load.

The Program expanded eligibility criteria to include value-line LED products. These LED products resulted in comparable energy saving and were of similar quality to ENERGY STAR® bulbs, but had a shorter bulb life (14 years compared to 34 years). Because the lifetime savings of these lower-cost, short-life bulbs still result in cost-effective energy savings at a lower cost per bulb, the Trust included these lower-cost bulbs in the Program to incentivize as many LEDs as possible. ENERGY STAR® bulb criteria will shift in the early part of FY2017 to include more bulbs of shorter life spans, and the Program anticipates aligning with this ENERGY STAR® 2.0 criterion.

The Program's promotion of screw-in LED bulbs through the distributor channel has allowed the Trust to capture savings that might not have been realized otherwise. Businesses have a significant number of "screw-in" bulbs, but electricians and electrical contractors rarely target screw-in bulbs as part of a lighting project or sales visit. Reflected in the name of this initiative, businesses do not need an electrician or lighting contractor to upgrade screw-in bulbs. By partnering with lighting distributors, the Program identified businesses with significant saving opportunities from screw-in bulbs. The usage pattern of these commercial lights has a high coincidence with peak demand and is one of the Trust's most effective and lowest-cost opportunities for reducing peak demand and reducing costs of electricity generation. Note that, in addition to businesses, the screw-in LED initiative also benefited residential customers.

FY2016 marked the third year of incentivizing heat pump water heaters. While the Program has captured only a fraction of the electric water heater replacements in Maine, the technology is now more familiar to Maine households, plumbers, distributors, and retailers. Indeed, the Trust estimates that heat pump water heaters constitute 14% of the electric water heater market in Maine, which is approximately 14 times higher than the national average. In early FY2016, the federal government announced a residential energy efficiency tax credit for heat pump water heaters and other high-efficiency products. The combination of the tax credit and rebate resulted in an uptick in interest in heat pump water heaters in the last quarter of FY2016.

In FY2016, The Program incentivized nearly 3 million high-efficiency light bulbs, including more than 1.6 million LED bulbs.

The Consumer Products Program targeted homeowners seeking emergency water heater replacements by providing in-store displays and high-efficiency water heating information. The program incentivized more than 2,600 heat pump water heaters in FY2016.

Consumer Products Program

FY2017 Plans

The Program will continue to incentivize high-efficiency bulbs at retailers and distributors across the state, but will shift from a blend of CFLs and LEDs to only LEDs in FY2017. This shift reflects increased consumer interest in LED technology, lower LED prices, and the fact that LEDs work well in a broader range of sockets than CFLs. In addition to discounts at retailers, the Program will continue to focus on lighting distributors. Over the course of FY2016, the Program learned more about lighting distributor sales and their sales cycle. In FY2017, the Program may add sales incentives to further encourage distributors to find lighting sales opportunities in addition to driving customers to high-efficiency bulbs when they (or their contractors) visit a wholesaler. The successful partnership with distributors also may lead to discounting other products at distributors, including heat pump water heaters and some measures incentivized through the Business Incentive Program (BIP).

Rebates for room air purifiers and dehumidifiers were discontinued at the end of FY2016. Clothes washers and heat pump water heaters will be incentivized in FY2017 and, as in the previous year, the Program's focus will be on continuing to guide electric water heater replacements, in particular emergency replacements, to heat pump water heaters. This will include an ongoing blend of point-of-purchase information, sales associate and plumber training, digital advertising, and customer education. As with other programs and measures, the best advocates for heat pump water heaters are happy customers, and the Trust will continue to explore ways to leverage success stories through social media, educational campaigns, and referral programs.

Multifamily Initiative

The Multifamily Initiative provides financial incentives for building owners to install energy efficiency measures in multifamily buildings. This Initiative straddles the line between the commercial and residential sectors. Tenants achieve benefits, such as higher-quality lighting, more comfort, and lower utility costs where the tenants pay individual bills. Property owners also reap benefits through improved energy infrastructure, lower energy costs for common areas, and other landlord-covered energy expenses. Properties with five or more units are handled through BIP. Smaller multifamily buildings are processed through the Home Energy Savings Program (HESP).

Sectors Served

- Commercial and Industrial
- Small Business
- Multifamily
- Residential
- Low-Income Households

Funds Invested

- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Electric Efficiency Procurement

FY2016 Activities

In FY2015, the Trust's Multifamily Efficiency Program (MEP) discontinued the practice of offering free benchmarks and shifted its focus to promoting prescriptive measures, obviating the complications and cost of energy modeling. This streamlined the process and expanded the prescriptive measure list, making the program accessible to more building owners and contractors, at lower cost and with less hassle. In FY2016, the program was streamlined further and expanded its marketing potential by opening participation up to all 700 contractors and vendors in the Qualified Partner (QP) network. Indeed, many of the measures incentivized through MEP were similar to those in BIP's prescriptive incentive list. This change enabled the larger QP network to more easily participate in the Initiative and reduced Trust administration costs.

The BIP prescriptive list and the HESP offerings included a number of measures, ranging from ductless heat pumps (DHPs) and insulation to central boilers, many of which have application in multifamily buildings. In FY2016, building owners were particularly interested in installing DHPs in individual apartments to reduce energy costs from central heating systems and to increase tenant control and comfort.

In addition to the program administration efforts described above, Staff spent significant time and effort reaching out to building owner groups and holding informational sessions to drive demand.

FY2016 Results

The Multifamily Initiative incentivized energy-saving measures in 437 buildings. Fifty-eight of those buildings participated through BIP, and 379 of them participated through HESP. The upgrades supported through the Initiative are projected to save approximately 961,000 MMBtu in lifetime energy savings, more than 63,300 MMBtu per year.

FY2016 Analysis

Streamlining Initiative participation for larger multifamily building owners and efficiency contractors was a significant success. Few contractors in Maine focus exclusively on multifamily buildings. By expanding the marketing and implementation of the Initiative to all QPs, instead of just a designated subset of specialists, participation was made easier for owners and contractors alike.

Participation in the Initiative was modest in FY2016 compared to the number of buildings that participated in FY2015. Staff attributes the lower participation levels to the combined dampening effect of lower energy costs and the suspension of some measures in BIP.

DHPs and high-efficiency central boilers were the most popular measures installed in FY2016. With that in mind, the Trust plans to conduct targeted outreach around these energy-saving opportunities in FY2017.

Table 13: Multifamily Initiative Results[12]

Metric	Value
Total Participants	437
Total Projects	2,697
Annual MMBtu Savings	63,362
Lifetime MMBtu Savings	960,659
Efficiency Maine Incentives	$1,308,282
Participant Costs	$2,777,577

12 Due to its approach to accounting for program costs and benefits of multifamily energy efficiency projects, the Trust has included the results of multifamily building activity in BIP in Table 7 and HESP in Table 15. Table 13 serves to highlight the multifamily-specific information reported in those Program totals.

Streamlining Initiative participation for larger multifamily building owners and efficiency contractors was a significant success.

When this multifamily complex in Yarmouth made the switch from propane to natural gas, the building owner installed high-efficiency condensing boilers with the help of Efficiency Maine incentives. Over 400 efficiency projects received help from Efficiency Maine's Multifamily Initiative in FY2016.

Multifamily Initiative

FY2017 Plans

There remains a significant cost-effective energy-saving opportunity in the multifamily sector. In FY2017, the Trust will increase direct outreach to multifamily building owners, as well as participation in multifamily association meetings and conferences to reach more prospective participants. An expanded incentive list for BIP should also benefit this Initiative. For example, exterior lighting is a significant opportunity for the multifamily sector.

In addition, the Maine Advanced Building Program (MAB) guidelines will include high-performance multifamily buildings in FY2017. This will allow the Trust to better target new multifamily buildings and large-scale renovations.

Residential Sector

The following section of the Annual Report provides a short description of each of the programs that serve the residential sector.

Home Energy Savings Program

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Low-Income Initiatives

Page 50

Home Energy Savings Program

The Home Energy Savings Program (HESP) drives market-based home weatherization and heating demand reduction by offering rebates and loans, providing customer education, and developing a vendor network.

Sectors Served
- Multifamily
- Residential
- Low-Income Households

Funds Invested
- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability Program
- Forward Capacity Market

FY2016 Activities

HESP encourages energy upgrades for residential customers, including single-family homes and multifamily homes with up to four units. Program activity in FY2016 fell into one of three categories of measures: supplemental heating systems, central heating systems, and building envelope improvements.

Despite the drop in energy prices, program activity was solid through the course of the year. The Program undertook a number of outreach campaigns to maintain customer awareness and demand, particularly in the spring when home energy efficiency project activity typically declines. The Program published advertisements in the home improvement sections of Maine newspapers and continued its robust, highly cost-effective web campaign. In addition to advertising with online media channels (including Hulu, YouTube, Pandora Radio, and Google Adwords), the Program significantly expanded its social media presence on Facebook, facilitating productive conversations and information sharing among Mainers. The Program also delivered targeted outreach to natural gas utility customers, in particular the newly eligible customers in Bangor Natural Gas and Maine Natural Gas territories.

Program Staff also made routine visits to communities, attended public events throughout the state, and generated earned media by conducting interviews about the offerings and benefits of the Program and of energy efficiency in general. The Program's delivery team engaged the home performance contractor community directly through phone and email communications, as well as through the use of monthly webinars. Over the past year, input received helped identify program design improvements.

HESP implemented two notable changes to its direct rebate incentives in FY2016. First, the Program raised incentive levels for attic, basement, and exterior wall insulation measures from $500 to $700 to spur greater activity. Second, the Program increased the lifetime rebate cap per home from $1,500 to $5,000, enabling more homeowners to pursue a phased approach to achieve more comprehensive energy efficiency improvements.

In addition to direct rebate incentives, HESP maintained a variety of loan product offerings in FY2016, including secured Property-Assessed Clean Energy (PACE) loans and unsecured energy loans. HESP discontinued offering new PowerSaver loans in FY2016 after the U.S. Department of Housing and Urban Development's pilot program came to a close in May 2015.

FY2016 Results

As with the first two years of program activity, ductless heat pumps (DHPs) remained the most popular measure in FY2016; Maine homeowners installed more than 4,800 high-efficiency DHPs in FY2016. There was also significant interest in pellet stoves: 177 were installed in Maine homes through the program year, primarily during the fall and winter months. Maine currently leads the northeast region in the number of pellet stove installations.

In FY2016, Efficiency Maine provided 500 loans supporting $4.2 million worth of home energy upgrade projects; unsecured loans accounted for 80% of dollar volume and 88% of the total number of loans the Trust issued. The average amount financed per loan was $8,400. Since the Trust started offering loans for home energy upgrades, more than 1,850 projects have been financed, and total funds lent exceed $18 million. Fewer than 1% of loans of any type offered under HESP are more than 60 days delinquent.

Table 14 summarizes the electricity reduction results of HESP in FY2016. The Program incentivized 4,879 DHP installations for a projected lifetime energy benefit of more than $15.7 million. This initiative resulted in a benefit-to-cost ratio of 4.23. All of the savings attributable to the heat pumps installed through HESP and reported in this table are limited to electricity savings.[13]

Table 15 summarizes the thermal energy-saving results of HESP. In FY2016, the program completed 3,404 home energy upgrades for a projected lifetime energy benefit of $32.3 million. These energy-saving projects will, over the lifetime of the measures, save Mainers almost 2 million MMBtu (equivalent to nearly 14 million gallons of heating oil). These savings will significantly lower current and future energy costs throughout the state.

Table 14: Home Energy Savings Program Electric Results

Metric	Value
Total Participants	4,772
Total Projects	4,879
Annual kWh Savings	9,249,035
Lifetime kWh Savings	166,482,630
Efficiency Maine Costs	$2,837,287
Participant Costs	$888,660
Lifetime Energy Benefit	$15,742,826
Benefit-to-Cost-Ratio	4.23

Table 15: Home Energy Savings Program Thermal Results[14]

Metric	Natural Gas (Value)	Other Fuels (Value)
Total Participants	198	2,950
Total Projects	214	3,190
Annual MMBtu Savings	5,356	79,878
Lifetime MMBtu Savings	124,424	1,855,554
Efficiency Maine Costs	$260,019	$4,096,936
Participant Costs	$1,074,794	$16,028,541
Lifetime Energy Benefit	$2,027,715	$30,239,569
Benefit to Cost Ratio	1.52	1.50

13 The Trust does not factor avoided use of other heating fuels in its benefit-to-cost analysis for heat pumps installed through HESP. The Trust assumes that most homeowners participating in HESP have decided to install a heat pump and the Trust influences the decision between purchasing a standard-efficiency and high-efficiency heat pump. **14** Due to its approach to accounting for program costs and benefits of home energy efficiency projects, the Trust has included the results of low-income activity in HESP in Table 15. However, the description and analysis of the activities from Low-Income Home Energy Savings Program are reported in the Low-Income Initiatives section.

FY2016 Analysis

As in FY2015, the Program was popular and continued to spur significant co-investment on the part of Maine residents. The Trust's push to add unsecured energy loans to the loan portfolio in FY2014 continued to pay dividends throughout FY2016, with more and more homeowners financing smaller energy projects through the Trust.

Despite the Trust's modification to participant incentive caps, most participants in FY2016 chose only one of the energy improvements eligible for a rebate under the Program. Given increasing numbers of returning customers, it appears that the Program's support for an approach in which home energy upgrades are completed in multiple stages, or phases, over a period of years is working.

As noted above, the Program instituted enhanced incentives for high-efficiency wood and pellet stoves to promote greater uptake of these measures. This corresponded with a surge in pellet stove rebates in the fall and winter of FY2016. Activity subsided in the second half of the year due to seasonality of installations and the historically low price of oil.

As in FY2015, the Program was popular and continued to spur significant co-investment on the part of Maine residents.

Trust Staff participated in numerous informational fairs and expos across the state. Here, Dana Fischer represents Efficiency Maine at the Greenfest Home Energy Fair at the Ocean Avenue Elementary School in Portland.

Home Energy Savings Program

FY2017 Plans

Beginning in FY2017, HESP will require energy auditors to provide customers — and the Trust — with an "Energy Assessment Checklist" when a home energy assessment is performed. This document will give homeowners an overview of their current energy profile and equipment and list three to five potential action items for further investment. In addition to serving as a useful source of information and recommendations for customers, the checklist will be a helpful screening tool for HESP in targeting future outreach.

HESP will also focus on promoting best practices for heat pumps, beginning with the distribution of a publication providing "Heat Pump User Tips" and a series of "Heat Pump Tip" email newsletters to program participants. Additionally, the Program will explore the use of wireless controls and accessories that might enhance the effectiveness and usability of this increasingly popular technology. The Program also plans to examine best practices in whole-home use of heat pumps to increase the overall percentage of heating load provided by these low-carbon, high-efficiency heaters. To that end, the Trust will design an incentive structure to promote appropriate installation of multiple heat pump units; in FY2016, HESP limited rebates to one heat pump per home.

The Program will also continue robust marketing and outreach to maintain program activity and to counteract any reduced demand due to lower costs of heating fuels. In FY2017, the Program plans to continue the use of the broad array of marketing channels currently being used. One area of increased attention will be intensifying collaboration and information sharing with municipalities and community-based organizations. For example, the Program will provide the Maine Municipal Association with a "Collective Purchase Toolkit" to guide municipalities through the planning and execution of local independent bulk purchase of energy efficiency services and equipment. The Trust has also worked with a number of municipalities to include HESP-related information with tax bill mailings in FY2017. The City of Bangor will provide enhanced incentives to residents who participate in HESP; the Program will explore similar opportunities with other municipalities in the coming year.

Low-Income Initiatives

The Trust implements several initiatives that are targeted to low-income households; the resulting blend of approaches is designed to overcome obstacles to program participation and implementation for Maine's low-income households.

Sectors Served
- Low-Income Households

Funds Invested
- Electric Efficiency Procurement
- Maine Yankee Settlement
- Natural Gas Efficiency Procurement
- Regional Greenhouse Gas Initiative
- Maine Power Reliability

In FY2016, one approach was direct installation of efficiency measures, where the Trust funded 100% of the installation cost and oversaw contractor support. This type of initiative effectively addresses the customer first-cost and financing barriers to low-income home upgrades, but also entails higher program costs per project and, given the Trust's finite budgets, reaches fewer participants. Direct install projects must include significant energy savings to be cost-effective.

The Trust also offers low-income initiatives that can serve more households with lower administration and delivery costs than the direct install approach. The Trust's largest Low-Income Initiative in FY2016 was delivered through the Consumer Products Program, discounting high-efficiency bulbs and offering rebates for high-efficiency appliances. A significant portion of Maine's retail customers are low-income, and the Trust has been able to reach a large population of low-income customers in the store through this channel. The Trust also reaches a large number of low-income households by distributing high-efficiency bulbs, free of charge, to food pantry customers.

The Trust also offered the Low-Income Home Energy Savings Program (LIHESP) in FY2016 to provide additional incentives and financing to low-income residents, modeled on the market-based approach of HESP, and launched the new Arrearage Management Program (AMP), which provides do-it-yourself kits to low-income households that have committed to working off the balances on their past due electric bills.

This section describes two of the Low-Income Initiatives that are administered independently: the Low-Income Direct Install (LIDI) Initiative and AMP. It also describes three Low-Income Initiatives administered in connection with other programs: Consumer Products Program markdowns; the Food Pantry Light Bulb Distribution Initiative, which is administered through the Consumer Products Program; and LIHESP, which is administered as part of HESP.

FY2016 Activities

Low-Income Direct Install Initiative

In FY2016, the Trust's LIDI Initiative invested Regional Greenhouse Gas Initiative (RGGI) funds in high-efficiency DHPs. It also invested Natural Gas Efficiency Procurement assets in air sealing and insulation projects in the homes of natural gas customers. These initiatives focused on customers eligible for the Low-Income Home Energy Assistance Program (LIHEAP).[15] In the past, Efficiency Maine has worked with Community Action Agencies (CAAs) to identify low-income homes suitable for high-efficiency measures (e.g., DHPs) and their subsequent installation. In FY2016, Efficiency Maine continued to work with local CAAs and also partnered directly with Maine's four officially recognized Native American tribes because their housing administration is run independently from the CAA system.

In addition, the Trust engaged independent contractors directly to provide weatherization services for natural gas customers. For FY2016, the Trust shifted its focus from gas-fired multifamily units to owner-occupied single-family homes. To generate the greatest possible activity from the targeted households, the Trust conducted significant outreach, including direct phone calls and mailings.

Seventy-five LIDI Initiative electric projects initiated in FY2015 were completed in early FY2016. These projects installed heat pump water heaters in low-income homes previously served with electric resistance water heaters. The projects also included low-flow devices to further reduce water heating needs, as well as high-efficiency CFL light bulbs. There were no new LIDI Initiative electric projects initiated in FY2016.

15 LIHEAP is a program administered by the U.S. Department of Health and Human Services that provides families with initiatives that assist them with energy costs. The program provides federally funded assistance in managing costs associated with home energy bills, energy crises, and weatherization and energy-related minor home repairs.

Arrearage Management Program

In another Low-Income Initiative, the Trust supported the electric utilities' AMP. The AMP initiatives are required of each utility by a Maine law enacted in April 2014. The AMP legislation was intended to help reduce the number of low-income customers in arrears on their electric bills and, therefore, the "bad debt" associated with customers who fail to pay their utility bills. Customers who agree to join the program are enrolled in a payment plan with the utilities and are contacted by the Trust with information and analysis about their energy usage, energy-saving options, and a free offer for a do-it-yourself electricity-use-reduction kit (DIY kit). Activities in FY2016 included ongoing collaboration with utilities to identify program participants, delivery of information about their electricity data, and contact with offers of the DIY kit.

Consumer Products Program

The Trust invests low-income funds in the Consumer Products Program to target low-income Mainers at the store. In FY2016, these funds were used to mark down the cost of high-efficiency light bulbs, as well as to incentivize the purchase of high-efficiency air purifiers, clothes washers, dehumidifiers, and heat pump water heaters. By marking down bulbs and rebating high-efficiency appliances, the Trust is able to influence significant energy decisions at the point of purchase. Historically, this channel has been estimated to reach more low-income consumers than any other approach employed in the Low-Income Initiatives. Evaluation results estimate that 16% of participants in the lighting portion of the Program and 8% of participants in the appliance portion of the Program qualify as low-income.

Food Pantry Light Bulb Distribution

The Trust also distributed high-efficiency bulbs to food pantries across the state. In the past, the Trust supplied food pantries through the Good Shepherd Food Bank distribution network. But space constraints at Good Shepherd required the Trust to take over all aspects of bulb distribution, including direct outreach to food pantries, delivery, and stocking. The program frequently mailed bulb request forms to food pantries or phoned to check on supplies, in addition to conducting regular site visits. This direct contact paid off: Over the course of the year, the Trust was able to add more food pantries to the distribution network and to offer different bulb types and wattages to food pantry customers. In FY2016, the Trust distributed approximately 230,000 high-efficiency bulbs through this channel.

Low-Income Home Energy Savings Program

In late FY2015, the Trust launched an initiative — LIHESP — aimed at lowering the heating demand of low-income customers regardless of what type of heating fuel they use. This program offers enhancements on certain incentives offered through HESP, as well as micro-loans (up to $4,000) that allow a greater debt-to-income ratio and lower credit score than other unsecured energy loans. The program leverages the full network of Efficiency Maine contractors to reach low-income residents, including renters and Mainers who are LIHEAP-eligible but who may not have applied for fuel assistance. For the first few months of LIHESP, the program offerings were made available

to customers on the LIHEAP list, as well as to customers who met specific income criteria. By providing a $100 co-pay, participants received an additional $500 worth of energy efficiency work, including a home energy assessment and six hours of air sealing. In October 2015, the program added a supplementary incentive: For an additional $100 co-pay, a participating customer would receive a second $500 toward an "other efficiency measure," such as spray foam insulation in basement box sills, insulation and air-sealing of a mobile home underbelly, or repair and insulation of basement and attic hatches. In late FY2016, the program expanded its eligibility criteria to encourage weatherization of the most affordable portions of the housing stock where low-income residents are likely to live, as well as to enable easier identification of eligible homes by homeowners, contractors, and municipalities. Under the new program guidelines, homeowners who own and live in mobile homes or in properties with a total town assessed value of less than $80,000 also qualify for the enhanced weatherization incentives. Throughout FY2016, LIHESP sent out mailers and conducted an outbound call campaign to raise awareness about this incentive package in low-income communities.

FY2016 Results

Low-Income Direct Install Initiative

As noted above, the Trust did not initiate any new LIDI Initiative projects in FY2016 to invest the electricity conservation funds set aside for Low-Income Initiatives. Rather, funds were dedicated to completing 75 heat pump water heater projects that were committed to in FY2015. The balance of this budget was directed to funding measures through AMP, the Consumer Products Program, and the food pantry initiative. The metrics associated with the 75 high-efficiency water heaters are presented in Table 16.

Another part of the Trust's LIDI Initiative was aimed at saving heating oil, natural gas, and other heating fuels. This initiative resulted in the installation of more than 200 high-efficiency DHPs in low-income homes. This included 118 in homes located on reservation lands owned by the Aroostook Band of Micmacs, the Houlton Band of Maliseet Indians, the Passamaquoddy Tribe of Indian Township, the Passamaquoddy Tribe at Pleasant Point, and the Penobscot Indian Nation. In total, these installations will reduce energy consumption by more than 122,000 MMBtu and save the participating households more than $2.5 million over the life of the measures. These heat pump project costs were paid from RGGI funds. The Trust also conducted 41 home energy audits to assess energy-saving opportunities in the homes of LIHEAP-eligible gas-fired single-family homes. These audits resulted in 23 air-sealing and insulation projects that will increase comfort and lower ongoing energy costs. The gas project costs were paid from the Natural Gas Efficiency Procurement.

Arrearage Management Program

Six of the 12 Maine electric utilities enrolled 673 participants in AMP in FY2016. Those participants received energy usage assessments from the Trust, and 185 households requested and received DIY kits with electricity-use-reduction measures, including LED bulbs, low-flow aerators, and low-flow shower heads. AMP participants identified as having electrically heated hot water received a kit with targeted water heating saving measures. The kits were accompanied by energy use reports, installation guidelines, additional energy-saving tips, and information about rebates and financing. After installation, these energy-saving measures will result in lifetime savings of more than 717,000 kWh and $112,000. The results are presented in Table 18. It should be noted that the lifetime benefits and benefit-to-cost ratio in this table do not reflect the economic benefit, if any, that may occur as a result of more-efficient homes reducing future "bad debt" for utilities and their ratepayers.

Consumer Products Program

The Trust estimates that it reached more than 30,000 low-income households by investing low-income funds through the Consumer Products Program. In total, the installation of these bulbs and appliances will result in more than 12.2 million annual kWh savings.

Food Pantry Light Bulb Distribution

The Trust distributed more than 189,000 high-efficiency bulbs through food pantries and mobile food pantry events, reaching an estimated 16,000 low-income households. In total, the installation of these bulbs will result in almost 4.9 million annual kWh savings.

Low-Income Home Energy Savings Program

LIHESP completed 30 home energy upgrades for a projected lifetime energy benefit of almost $149,000. These energy-saving projects will save Mainers more than 10,000 MMBtu (equivalent to nearly 73,000 gallons of heating oil) over the life of the measures. This initiative resulted in a benefit-to-cost ratio of

Table 16: Low-Income Direct Install Initiative Electric Results[16]

Metric	Value
Total Participants	75
Total Projects	75
Annual kWh Savings	178,937
Lifetime kWh Savings	1,647,776
Efficiency Maine Costs	$137,634
Participant Costs	$253
Lifetime Energy Benefit	$163,769
Benefit-to-Cost-Ratio	1.19

Table 17: Low-Income Direct Install Initiative Thermal Results

Metric	Natural Gas (Value)	Other Fuels (Value)
Total Participants	21	203
Total Projects	21	203
Annual MMBtu Savings	791	6,058
Lifetime MMBtu Savings	12,990	109,041
Efficiency Maine Costs	$74,500	$699,988
Participant Costs	$0	$975,580
Lifetime Energy Benefit	$97,931	$2,454,693
Benefit-to-Cost-Ratio	1.31	1.46

16 These LIDI Initiative electric projects were initiated in FY2015 but completed in FY2016. There were no new LIDI Initiative electric projects initiated in FY2016.

Table 18: Arrearage Management Program Results

Metric	Value
Total Participants	201
Total Projects	201
Annual kWh Savings	63,011
Lifetime kWh Savings	717,348
Efficiency Maine Costs	$115,669
Participant Costs	$8,984
Lifetime Energy Benefit	$112,396
Benefit-to-Cost-Ratio	0.90

Table 19: Consumer Products Program Low-Income Participation Results[17]

Metric	Retail Lighting (Value)	Appliance Rebate (Value)
Total Bulbs	410,526	-
Total Appliances	-	853
Annual kWh Savings	11,729,965	544,298
Lifetime kWh Savings	114,811,840	5,320,572
Efficiency Maine Costs	$1,484,032	$112,770
Participant Costs	$3,292,919	$24,096
Lifetime Energy Benefit	$11,869,798	$540,989
Benefit-to-Cost-Ratio	2.48	3.95

17 The results in Table 19 are also captured in the Consumer Products Program section in Table 12. Table 12 reflects totals for the whole Program, while Table 19 serves to highlight low-income participation only.

1.58. Finally, the Trust's residential loan program issued 43 micro-loans in FY2016, helping homeowners with a challenged credit history invest $205,000 in more comprehensive, cost-effective energy efficiency upgrades.[19]

FY2016 Analysis

The Trust continued to stretch low-income funds as far as possible through a blend of direct installation, DIY, and market-based programs. More low-income households were served this way than would be possible through direct installation alone. But the launch and management of multiple initiatives has missed some potential synergies for deeper energy savings and/or customer identification. With that in mind, in FY2016, the Trust dedicated a staff member to coordinate low-income outreach and to leverage ways in which one channel or initiative could act as an entry point for others. For example, food pantry customers or AMP participants may be candidates for LIHESP. In addition, the Trust placed a greater emphasis on outreach to low-income advocates and other community organizations to spread the word about all of the Trust's low-income initiatives.

Low-Income Direct Install Initiative

Heat pumps were installed in single-family low-income households two different ways: installation agreements with CAAs and direct installation by the Trust's independent contractors. The Trust was able to achieve significantly lower installation and administrative costs through the direct installation method compared to the CAAs and the average heat pump costs paid by customers through the Trust's market-based programs. As part of that direct installation, Native American community governments identified households with high energy costs for the Trust. Based on this experience, the Trust is considering other direct management and installation opportunities for low-income initiatives. The heat pump installations achieved considerable energy savings, especially when installed in trailers that had originally been built for different climates. Many of the homes served this year were trailers that had been built for southern climates and were later donated to Maine Native American communities by the Federal Emergency Management Agency; many had outdoor electric furnaces unfit for the Maine climate.

The number of natural gas-heated homes upgraded through direct installation was more limited. Program guidelines targeted projects at households that were LIHEAP-eligible or on the LIHEAP list. While the number of LIHEAP-eligible homes is greater than the number on the list maintained by the Maine State Housing Authority (MaineHousing), in FY2016, the Trust focused first on the 155 owner-occupied households that were on the LIHEAP list as of FY2014. The low natural gas fuel prices also restricted the number and scope of energy-saving measures that could be installed in the participating households and the energy savings that could be claimed from the installations.

Arrearage Management Program

The collaborative design and management of AMP with the Public Utilities Commission (PUC), the utilities, the Trust, and the Office of the Public Advocate (OPA) was a rewarding process for all parties involved. The program was launched in late 2015 and quickly grew to 637 households. The Trust sought ways to cost-effectively help utility customers in arrears, and decided to offer low-cost DIY kits. The effectiveness and persistence of these energy savings will be tracked as the program continues.

Consumer Products Program

By piggybacking administration of a portion of the Low-Income Initiatives onto the much larger Consumer Products Program, the Trust was able to stretch the budget to reach more homes with more energy-saving measures. This enabled the program to reduce electric costs for more households than would have been possible through exclusive reliance on a direct installation or an independent program.

Food Pantry Light Bulb Distribution

The Trust's distribution of light bulbs through food pantries transitioned from relying on the Good Shepherd Food Bank's distribution network to an independent network. Over the course of the year, the initiative was able to add 100 food pantries to the list of participating distribution sites. Direct outreach and direct stocking enabled the program to distribute more than 189,000 bulbs.

Low-Income Home Energy Savings Program

LIHESP experienced slower activity than had been hoped for in FY2016. Despite program adjustments throughout the course of the year, including additional

Table 20: Food Pantry Light Bulb Distribution Results[18]

Metric	Value
Total Bulbs	189,303
Annual kWh Savings	4,872,659
Lifetime kWh Savings	34,108,615
Efficiency Maine Costs	$344,401
Participant Costs	$1,228,530
Lifetime Energy Benefit	$4,634,144
Benefit-to-Cost-Ratio	2.95

Table 21: Low-Income Home Energy Savings Program Thermal Results[20]

Metric	Value
Total Participants	30
Total Projects	30
Annual MMBtu Savings	502
Lifetime MMBtu Savings	10,101
Efficiency Maine Costs	$52,094
Participant Costs	$41,735
Lifetime Energy Benefit	$148,703
Benefit-to-Cost-Ratio	1.58

Table 22: Low-Income Initiatives Total Results

Metric	Value
Annual kWh Savings	17,388,870
Lifetime kWh Savings	156,606,150
Annual MMBtu Savings	7,350
Lifetime MMBtu Savings	132,133
Efficiency Maine Costs	$3,021,088
Participant Costs	$5,572,097
Lifetime Energy Benefit	$20,022,423

18 Due to its approach to accounting for program costs and benefits of distributing efficient lights through food pantries, the Trust has included the results of that activity in the Consumer Products section in Table 12. **19** The costs and savings associated with these loans are captured in the HESP section in Table 15, not in Table 21. **20** Due to its approach to accounting for program costs and benefits of home energy efficiency projects, the Trust has included the LIHESP results in the HESP section in Table 15.

incentives and expanded eligibility criteria, participation remained low. Potential participants, advocates, and contractors found it difficult to identify eligible households and drive demand for efficiency services. Due to the confidential nature of LIHEAP listings and statewide distribution of eligible homes, the Trust was conservative in its approach to conveying program opportunities to targeted groups. To date, direct mailings and calls have not proven particularly effective at increasing uptake in the program. Toward the end of the year, program staff began to focus efforts on collaborating with municipalities, nonprofits, and low-income advocates across the state to find ways to spread the word about the program through established low-income service channels and to discuss how they can leverage the program on behalf of their communities. This increased collaboration began to show significant promise as the programs entered FY2017.

Six of the 12 Maine electric utilities enrolled 673 participants in AMP in FY2016.

The Trust runs initiatives to bring energy-saving solutions low-income Mainers, ranging from the direct installation of high-efficiency equipment to the distribution of high-efficiency bulbs at Maine food pantries. Here, high-efficiency LEDs are included in produce donation boxes at the Bath Area Food Pantry.

Low-Income Initiatives

FY2017 Plans

Several aspects of FY2017 plans for Low-Income Initiatives were not finalized in the PUC's initial approval of Triennial Plan III, and these aspects were made the subject of continued analysis and process. In FY2017, the Trust will continue its efforts to design and implement low-income initiatives in a way that equitably distributes cost-effective energy savings across low-income households while also attempting to do more through the direct install approach. As described above, the Trust will pursue more targeted outreach to partner organizations serving the low-income community, including CAAs, General Assistance Program Officers, and food pantries. In addition, the Trust will continue to advertise low-income program opportunities through the Trust's contractor network; direct mail; and the statewide marketing of other Trust programs, including the Consumer Products Program and HESP.

Low-Income Direct Install
In FY2017, the Trust may expand the use of RGGI funds to support LIHESP so that more households can be served through that channel and so that the funds may be stretched further by leveraging some amount of customer contribution toward the energy projects. The direct installation of natural gas efficiency measures will continue, as will the efforts to explore expanding program eligibility criteria and/or finding other ways to identify low-income households in cooperation with utilities. This initiative will continue to be challenging given low natural gas commodity prices.

Arrearage Management Program
AMP is anticipated to grow in FY2017 as more electric utility customers have been found to be eligible for program participation. The Trust will continue to share energy-consumption information and DIY kits. The Trust is also looking at approaching AMP customers as part of the LIDI Initiative and/or LIHESP.

Consumer Products Program
Although the Consumer Products Program was the largest channel for reaching low-income Mainers in FY2016, Trust stakeholders recommended investing low-income funds through dedicated low-income programs in FY2017. The Trust plans to continue to reach low-income Mainers making purchasing decisions in the store, but they will be served through the Consumer Products Program using only the all-income budget. Funding that is earmarked for low-income customers will be reserved for specifically targeted low-income initiatives that are approved through the Triennial Plan III proceeding at the PUC.

Food Pantry Light Bulb Distribution
The Trust will move to distributing exclusively LED bulbs (not CFLs) for efficient lighting at food pantries and continue to engage as many food pantries as possible in the program.

Low-Income Home Energy Savings Program
To incentivize greater participation and increase the energy savings per customer, LIHESP will initiate a revised rebate structure with combined measures in FY2017. The program will reduce the co-pay for a home energy assessment and six hours of air sealing from $100 to $50, and include a supplementary "Energy Upgrade Bundle"; customers will receive an additional primary measure (such as spray foam insulation), a replacement LED bulb for each incandescent bulb, and low-flow devices for all water fixtures. The program will also allow this $50 co-pay to be paid for by a third party, such as a municipality or a nonprofit. The program will require that the third party not be a contractor or any entity that would profit from the project. Just as with HESP customers, LIHESP customers will also receive an "Energy Assessment Checklist" for all weatherization projects in FY2017. This will provide both the customer and the Trust with a better picture of a home's energy profile, as well as a prioritized list of potential efficiency projects.

Strategic Initiatives

Evaluation, Measurement, and Verification

The purpose of the Trust's Evaluation, Measurement, and Verification (EM&V) strategy is to provide data-driven research and analysis to inform program design and delivery strategies, verify program results, and facilitate continuous program and organizational improvement. The Trust carries out this strategy using a combination of in-house initiatives and subcontracted, independent third-party reviews performed by firms that specialize in the evaluation of energy efficiency programs.

FY2016 Activities

Low-Income Multifamily Weatherization Program Evaluation

In FY2016, the Trust finalized an independent evaluation for the Low-Income Multifamily Weatherization (LIWx Multifamily) program. The LIWx Multifamily program had sought to increase the efficiency of electricity and natural gas use in Low-Income Home Energy Assistance Program (LIHEAP)-eligible multifamily homes in Maine through the installation of a suite of measures; some properties received weatherization measures, some received ductless heat pumps (DHPs), and some received both. Most properties, regardless of their upgrade type, also received some domestic hot water measures and CFL bulbs. The LIWx Multifamily program, as specifically described here, was launched in January 2012 and ended in June 2014 (the Trust has continued to provide weatherization for low-income homes under different program designs and using different delivery strategies). During this time, it completed efficiency upgrades at 84 electrically heated properties and one gas-heated property, affecting more than 2,300 housing units.

The Trust commissioned an evaluation of both the program's process and impact for the FY2013 period. The evaluation team reviewed program data, interviewed staff and partners, surveyed tenants, collected energy use data, estimated energy savings, and assessed program results. Looking exclusively at the economics of the electricity savings, the evaluation determined that the program's electric measures achieved a Total Resource Cost (TRC) benefit-to-cost ratio of 0.76. The program's gas measures achieved a TRC benefit-to-cost ratio of 0.82.

Evaluators found the results varied significantly depending on the specific contractor that screened the properties and oversaw the installation of the upgrades. The portfolio of projects completed by the best performing contractor yielded an average benefit-to-cost ratio of 1.46. The portfolio of projects completed by the less successful contractors yielded a benefit-to-cost ratio of 0.31. This indicates that the program, as designed, has the potential to be cost-effective, but that the way in which it is implemented can significantly affect the actual results.

The evaluation, combined with additional post-evaluation research conducted by the Trust, revealed some critical insights that will inform future efforts to provide thermal upgrades to low-income homes. First, a qualified and committed delivery team contractor plays a critical role in the success of the program; it is important for the delivery team contractor to limit the upgrades to units having substantial savings opportunities and to conservatively estimate energy savings potential, and to select and oversee quality trade allies to perform the work. Second, the program must provide more comprehensive, tailored information and training, as necessary, so that tenants and property managers can make optimal use of heat pumps and achieve higher cost-effectiveness. Twenty percent of tenants reported that they used the new DHP only as a backup heater (not as their primary heater to displace less-efficient, resistant baseboard heaters) or not knowing which system they were using at any given time. Third, the program is likely to achieve higher energy savings, and better cost-effectiveness, in buildings that have fewer and/or larger units compared to large buildings containing more and/or smaller units.

Other EM&V Activities

The Trust's other significant EM&V activities during FY2016 included enhancing the Trust's project-tracking database, called "effRT"; demonstrating compliance with Forward Capacity Market (FCM) measurement and verification rules; revising the Technical Reference Manuals (TRMs) for each of the residential, commercial, and multifamily program sectors; gathering performance data on distributed generation installations; and initiating real-time customer surveys through the call center.

The effRT database platform manages the data for all of the Trust's active programs and ensures consistent and accurate estimates of energy savings. It also improves program activity tracking and data integrity. The system enables contractors (such as Qualified Partners [QPs]) to expedite the processing of incentives, significantly reducing and in some cases eliminating paperwork. In FY2016, the Trust added to effRT

Table 23: FY2016 EM&V Project Activity

Subject	Type	Prime Contractor	Total Project Budget	FY2016 Expenditures	Funding Source(s)	Project Start Date	Project End Date
Low-Income Multifamily Weatherization	Impact Process Evaluation	NMR Group	$199,986	$4,354	Electric Procurement	Apr- 14	Jan- 16
TRM Support and FCM M&V Compliance	Technical Services & Evaluation	Evergreen Economics	$58,940	$45,064	Electric Procurement, FCM	Mar- 15	Jul- 16
Distributed Generation	Metering	TILSON Technology Management	$36,322	$17,753	FCM	Sep- 14	Dec- 16
Large Customer Program	Impact & Process Evaluation	Nexant	$142,347	$126,527	Electric Procurement	Mar- 15	Jun- 17
Business Incentive Program & Boothbay Pilot	Impact & Process Evaluation	Nexant	$289,978	$167,965	Electric Procurement	Mar- 15	Jun- 17

new project information on small custom projects through the Large Custom Program, on the Low-Income Natural Gas program, and on the Arrearage Management Program.

With respect to the FCM that is operated by the Independent System Operator for New England (ISO-NE), the Trust transitioned from using monthly spreadsheet-based reporting to direct syncing of records in the effRT database with the ISO-NE-maintained Energy Efficiency Measure database. This upgrade required significant data reconciliation and added functionality. As a result of the upgrade, ISO-NE and Efficiency Maine are synchronized at the record level, simplifying and improving the accuracy of monthly data reporting.

The Trust's individual TRMs for Residential, Commercial, and Multifamily programs provide documentation for the calculation of energy and demand savings from the portfolio of energy efficiency measures. Each TRM serves as a central repository for the methods, formulas, assumptions, and sources that are used to estimate savings from energy efficiency measures, and provides a common platform for analyzing energy savings across measures and programs. For each measure, the TRM provides a measure overview and documentation of gross energy and demand savings algorithms, efficiency assumptions for the baseline and efficient measure, deemed parameter values or instructions for inputs to savings algorithms, measure life and cost, and impact factors for calculating adjusted gross savings and net savings. In addition to conducting its standard annual TRM update, the Trust adjusted its TRMs periodically throughout the FY2016 as new information became available. In late FY2016, the Trust combined the Commercial and Multifamily TRMs into one document (the Commercial/Industrial and Multifamily TRM) to reflect the fact that the Trust had shifted the administration of the Multifamily Efficiency Program into the Business Incentive Program.

Table 23 shows all of the evaluation projects in FY2016. The table also shows the cost for each evaluation and its funding source(s).

In addition to the standard, ongoing activities directly related to EM&V, the Trust actively participated in two significant research and analysis projects in FY2016: the Avoided Energy Supply Costs Study for 2015 (2015 AESC Study) interim update and a series of adjustments to the Triennial Plan III model's methodology and assumptions throughout the settlement proceedings at the Public Utilities Commission (PUC).

AESC Study Update

During FY2015, the Trust participated in the regional AESC Study Group. The AESC Study Group contracted with Tabors Caramanis Rudkevich (TCR) to conduct a study of marginal energy supply costs that will be avoided due to reductions in the use of electricity, natural gas, and other fuels resulting from energy efficiency programs offered to customers throughout New England. The values generated in the AESC Study form part of the foundation of the Trust's cost-benefit analysis; the avoided costs from the study are used by the Trust to calculate the lifetime benefit from installed measures. These avoided costs represent the amount that would have been paid for the marginal energy and capacity consumed if not for the savings associated with the energy efficiency and distributed energy resources installed through the Trust's programs. The study was filed as part of the Trust's Triennial Plan III.

The AESC Study Group[21] includes a diverse group of regional electric utilities, gas utilities, and other efficiency program administrators. The group also includes stakeholders from other non-utility parties and government departments.

The AESC Study is typically revised every three years, with a mid-term update performed between each major revision. In FY2016, the Trust participated in a working group to evaluate new information and to update various model inputs, without making any major changes to the methodology. An interim update is scheduled for release around December 2016.

Triennial Plan Analysis and Updates

After submitting the draft Triennial Plan III to the PUC in December 2015, which was followed by an extensive process of discovery, the Trust participated in a settlement proceeding. The Trust worked with its contractor to answer questions from PUC staff and other interveners in the case regarding the three studies that formed the basis of the Triennial Plan: the analysis of cost-effective potential, the Residential Baseline Assessment, and the Commercial Baseline Assessment. The Trust updated its models based on the methodology and assumption agreed on in the Triennial Plan proceeding.

21 Sponsors of the study include the Trust, Eversource Energy (Northeast Utilities), Liberty Utilities, Cape Light Compact, United Illuminating Holdings, State of Vermont, New Hampshire Electric Co-op, Unitil, Columbia Gas of Massachusetts (NiSource), and National Grid.

Evaluation, Measurement, and Verification

FY2017 Plans

In 2017, the Trust will complete evaluations of the Business Incentive Program and the Large Custom Program. The Trust will also initiate an evaluation of Home Energy Savings Program to review program results from activities performed from FY2014 through FY2017. Other planned FY2017 research and evaluation project activity includes a price elasticity analysis for lighting, completing the AESC Study update, the Annual FCM Measurement and Verification Compliance Review, finalization of the Residential and Commercial/Industrial and Multifamily TRMs for FY2017, and development of updated TRMs for FY2018.

Plans for the effRT database platform include improving reporting and tracking, using effRT to assist in short- and long-term forecasting, and streamlining program processing in the database. The Trust will issue a competitive Request for Proposal (RFP) for database services in FY2017 as the current support contract ends in December 2016. As part of Triennial Plan III, the Trust committed to implementing concurrent program measurement and verification for a sample of projects. This will entail installation of metering equipment at time of measure installation, billing analysis, and rolling customer surveys. The Trust will also conduct interim program evaluations, including mid-year check-ups on new programs, to increase opportunities for program corrections and to take better advantage of independent evaluations. Finally, the Trust will explore the creation of a group of prequalified research and evaluation contractors to provide a ready source of support for ongoing research and evaluation activities to complement formal program evaluations.

Research and Evaluation Manager Laura Martel presents the Trust's EM&V plans outlined in Triennial Plan III.

Innovation

Technological improvements are a cornerstone of energy efficiency. The Trust intends for projects in the Innovation Program to demonstrate new types of energy efficiency, conservation or alternative energy measures, or new strategies for promoting such measures. The program focuses on measures that are commercially available and show significant potential to be cost-effective through energy savings or greenhouse gas savings but remain in need of further demonstration in the Maine marketplace.

FY2016 Activities

In FY2016, the Trust launched two new Innovation pilots aimed at Maine's commercial sector. The first Innovation pilot was designed to test the effectiveness of using heat pump water heaters (HPWHs) in commercial properties to take available waste heat (from the businesses' existing activities) and use it to generate hot water, creating a more efficient way of heating water than what was previously in place. The objective of the pilot was to research the effectiveness of HPWHs in locations with excess waste heat in the air, such as a boiler room and a laundromat. The pilot, which was not completed in FY2016 and is carrying over into FY2017, will use the waste heat generated near the HPWH unit and transfer the captured waste heat, using heat pump technology, into hot water. In addition to the potential energy savings from the more efficient water heating, the HPWHs are expected to cool and dehumidify the area. The pilot will measure the cost of installation (including labor, material, and equipment), monitor energy usage, track savings data, and record the businesses' experience with the new system.

The second Innovation pilot will develop and test a strategy for achieving energy savings through two practices: the application of interval data to identify and verify energy savings from operational modifications and the use of pay-for-performance incentives. As with the HPWH pilot, this demonstration of pay-for-performance for operational conservation has taken considerable time to set up and therefore it will be continuing into FY2017. In a preliminary stage of the pilot, the Trust partnered with the Maine Health Care Association to distribute a survey to the organization's members. The Trust will use the survey results and interval data analytics to select participants for the pilot. Participants will be educated on the value of interval data for assessing a building's performance and identifying opportunities for modified retro-commissioning (RCx)-style implementation strategies or "building tune-ups." One goal of the pilot is to test the effectiveness of using a building tune-up to avoid a more expensive RCx feasibility assessment. Pay-for-performance incentives will then be used to incentivize the initial tune-up and persistent energy savings.

Results of the two Innovation Pilots will be provided in the FY2017 Annual Report.

Innovation

FY2017 Plans

The Trust will continue the Innovation pilots previously discussed throughout FY2017. In addition, the Trust will issue a Request for Information (RFI) for new Innovation pilot ideas. The Trust's Triennial Plan III has outlined several target areas for Innovation over the next three years. These areas include voltage optimization, interval data and data analytics, distributed energy resources, electric vehicles, and financing strategies. In Maine, there is rising concern about, and sensitivity to, energy prices, grid reliability, and air emissions during periods of peak demand. Expanding in the areas outlined by Triennial Plan III has the potential to address emissions, lower costs, and depress peak demand prices. These benefits will flow to the program participants and other users of the electric grid.

Public Information and Outreach

Through numerous communications channels, the Trust provides information to consumers who are planning to purchase new lighting, appliances, heating systems, and other equipment, encouraging them to consider buying one of the more energy-efficient models available.

Information is disseminated through the Trust's website, printed flyers and brochures, traditional advertising, social media, and other multimedia tools. The Trust also manages targeted training sessions and attends industry events, such as forums and symposiums. The public information and outreach materials address saving energy and the co-benefits of energy-efficient choices.

The Trust's Public Information and Outreach initiatives also involve a number of stakeholder education and coordination activities. As Maine's leader in energy efficiency, the Trust is frequently called upon to convene stakeholder meetings on a range of energy issues. Trust Staff typically gathers input, conducts additional research, and generates reports to inform policy makers at the PUC or in the State Legislature.

FY2016 Activities

The Trust engaged in a wide range of activities related to public information and outreach in FY2016. These activities are discussed below and can be broken into the following categories: Events and Training, Call Center, Website, Social Media, Marketing and Awareness, and Stakeholder Coordination. The Trust continued to expand its reach in new media, including digital ads and social media.

Events and Training

The Trust hosted dozens of workshops and symposiums on energy technologies, efficiency programs, and successful case studies in FY2016. The audiences ranged from customers to contractors and vendors to policy makers. The Trust also was invited to participate as a panelist before gatherings of Maine businesses and residents. Typically, Trust staff reported on energy-efficient technologies and the Trust's programs at these events. Hosts for these events included several regional chambers of commerce, the Muskie School of Public Service, Maine professional associations, major Maine businesses, and numerous local citizens' "energy committees." In January 2016, the Trust held its annual symposium and awards ceremony for contractors and customers, "Investing in a Sustainable Energy Future: Recent Success of Energy Efficiency in Maine." U.S. Senator Susan Collins gave the keynote speech, and the Trust recognized Rick Karg, of Bethel, with the Philip C. Hastings Award for his significant contributions to energy efficiency in Maine and exemplary support to the Trust's programs.

The Trust's programs require contractors to have appropriate licenses and certifications for certain efficiency measures that they install to be eligible for incentives. In FY2016, the Trust offered scholarships for advanced heat pump installation training to support the contractor community in effectively adopting installation best practices for this new technology. The Trust also offered certification training for building operators and advanced building operators to ensure continued energy savings through effective energy management in large buildings across the state. Through these trainings, the Trust helped reduce market barriers confronting adoption of the measures.

Call Center

An important public information tool at the Trust's disposal is its Call Center. In FY2016, the Trust's Call Center was staffed by professional operators, located in Brunswick, at the toll-free number 866-ES-MAINE (866-376-2463). The Call Center was used to handle inbound and outbound calls related to all of the Trust's programs. The Call Center was staffed during normal working hours, and customer service agents were trained to provide basic information on all programs. Where detailed or more technical information was needed, the customer service agents made live transfers to Trust staff or specified delivery team contractors. The Trust continually oversaw the Call Center to make sure questions were answered appropriately and used feedback received by Call Center representatives to improve program resources and rebate processing.

Website

In FY2016, the Trust invested in enhancing the Efficiency Maine website at efficiencymaine.com. These investments advanced the Trust's goal of serving as a "go to" information resource on customer-oriented issues around controlling energy use and energy costs in Maine. The Efficiency Maine website now supplies energy information, online calculator tools, a library of printed and video case studies, tutorials on new energy technologies (such as ductless mini-split heat pumps), and searchable databases of home energy contractors and commercial contractors. In FY2016, the Trust refined many of its online resources, including rebate information, detailed information on energy technologies, and energy-saving tips. The Trust also created a dedicated website for Triennial Plan III resources and stakeholder materials.

Social Media

Social media now serves as an increasingly important way for the Trust to provide information and education to potential customers. The Trust is also able to prompt vibrant community discussions, where Mainers share their experiences with

Executive Director Michael Stoddard participates in a Muskie School of Public Service panel discussion on Earth Day. From left to right, U.S. Senator Angus King; Susan Sharon, Maine Public Broadcasting Network; Dr. Andrew Deutz, Nature Conservancy; and Michael Stoddard.

energy efficiency projects and Efficiency Maine programs. In this way, social media provides a digital platform for "word-of-mouth" information exchange — a key factor in driving Mainers to adopt energy-efficient technologies. Additionally, it is a channel for the Trust Staff to field questions about programs. In FY2016, the Trust focused its use of social media on promoting HESP and the Consumer Products Program. This outreach included traditional social media posts and advertising. Social media ads reached record numbers of Mainers: For example, one ad reached 68,811 Maine Facebook users in key demographics.

Marketing and Awareness

The Trust's marketing efforts are focused largely on educating potential customers about energy-efficient technologies or energy-saving solutions executed through specific program areas. The Trust also engaged in marketing and outreach efforts across programs, including outreach to community groups, nonprofit organizations, and low-income stakeholders. In addition, discussion of the Triennial Plan process in the media garnered some attention for energy efficiency and energy efficiency funding.

Stakeholder Processes

In the development of Triennial Plan III in FY2016, Trust staff conducted an extensive stakeholder engagement process involving group forums, individual meetings, as well as a dozen webinars providing detailed program reviews and guiding questions for input. All materials and webinar recordings were made available on a dedicated website that provided an ongoing means for stakeholders to submit questions, comments and recommendations, and supporting materials for the Trust to consider. The Staff then prepared and posted a draft plan for public comment online and at a final stakeholder forum prior to review by the Trustees, and ultimately the PUC.

The 127th Session of the Maine State Legislature also directed the Trust to spearhead two major stakeholder initiatives that occurred during FY2016.

First, the Legislature called upon the Trust to study, with the help of leading stakeholders in Maine and New England, contingency plans for promoting demand response (DR) that could be pursued in the event the existing DR regime was invalidated. At the time, a pending lawsuit challenged the authority of the existing regional DR programs run by ISO-NE and regulated by the Federal Energy Regulatory Commission (FERC). The Trust convened the Demand Response Working Group of Maine, and held four in-person meetings to solicit input from stakeholders. The Trust summarized the study's conclusions and recommendations in a report to the Joint Standing Committee on Energy, Utilities, and Technology.

The Trust was charged with a similar task following the passage of L.D. 946, a Resolve "To Establish a Moratorium on Assessments for Large Volume Customers of Gas Utilities and to Evaluate Cost-Effective Natural Gas Conservation and Efficiency Improvements for Large Volume Customers." The Legislature directed the Trust to meet with representatives of large volume natural gas customers and other interested stakeholders to examine alternatives for promoting and securing cost-effective natural gas conservation and efficiency improvements for such large volume customers. To that end, Trust Staff held meetings with industrial and institutional customers, utilities, government agencies, and nonprofits all over the state. The Trust submitted the resulting report of these meeting conclusions and recommendations to the Joint Standing Committee on Energy, Utilities, and Technology.

Public Information and Outreach

FY2017 Plans

The Trust has initiated a systematic review and potential redesign of its website, including conducting surveys to obtain stakeholder feedback. The Trust will also work to support program outreach goals. FY2017 is expected to see particular focus on outreach to promote natural gas measures, low-income initiatives, and the Small Business Initiative. In addition, the Trust will continue to expand its reach on social media through campaigns that will invite homeowners to reflect on their experiences with energy efficiency technologies.

The Trust plans to host a Combined Heat and Power (CHP) Forum in September 2016, as well as its Annual Awards and Energy Symposium in early 2017. The Trust also plans to participate in other symposiums, conferences, and industry meetings to share program information with efficiency professionals and potential customers.

The Trust's Philip C. Hastings Award recognizes an individual or organization whose exemplary efforts have furthered Maine's energy efficiency goals. Here, Hastings Award winner Rick Karg accepts his plaque at the 2016 Efficiency Maine annual symposium. From left to right, Leslie Chatfield, Rick Karg, U.S. Senator Susan Collins, and Efficiency Maine Executive Director Michael Stoddard.

Finance and Administration

Audit Results

The independent certified public accountant Runyon, Kersteen, Ouellette, Inc. (RKO) issued an audit report on the Trust's activities for the year ended June 30, 2016. The report covered: the Trust's internal control over financial reporting and compliance with government accounting standards and financial statements. The report was unanimously accepted by the Board of Trustees on September 21, 2016.

The report of the audit of the Trust's financial statements delivered an "unmodified opinion" and found "no material weaknesses" related to the Trust's internal controls. The auditors wrote:

> In our opinion, the financial statements … present fairly, in all material respects, the respective financial position of the governmental activities, the major fund, and the remaining fund information of Efficiency Maine Trust, as of June 30, 2016, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.[22]

As reported in the audit, the Trust's revenues and expenditures presented in the FY2016 Statement of Revenue, Expenditures, and Change in Fund Balance – Governmental Fund and Budgetary Comparison Schedule are $45,554,848 and $47,477,953, respectively, plus another $380,411 sent to state agencies, resulting in a decrease to fund balance of $2,303,516. The Trust's governmental fund balance as of June 30, 2016 was $41,301,032, of which $20,427,817 is restricted for operations and programs and $20,873,215 is restricted for grant and revolving loan activity. The Trust's net position as of June 30, 2016 was $41,301,032. The term "net position" refers to the difference between assets and liabilities. The change in net position for the year ended June 30, 2016 was a decrease of $2,307,454.

The Trust's revenues, expenditures, and fund balance for the 12 months of FY2016 are summarized in the following schedule.[23]

22 Efficiency Maine Trust, "Annual Financial Report for the Year Ended June 30, 2016," prepared by RKO, September 21, 2016, at 2. **23** Ibid., Statement 4, at 16.

Table 24: Statement of Revenues, Expenditures, and Changes in Fund Balance – Governmental Fund

	Fund
Revenues:	
Intergovernmental:	
System benefit charges	$ 2,2257,453
Alternative compliance mechanism	$ 198
Interest Income:	
Investments	$ 51,435
Loans	$ 598,963
Other Income	$ 1,006,984
Electric procurement	$ 18,500,000
Renewable resource	$ 76,959
Change in allowance for loan losses	$ 22,000
Long-term contracts	$ 489,905
Maine Power Reliability Settlement proceeds	$ 1,500,003
Maine Yankee Settlement proceeds	$ 2,000,000
Forward Capacity Market credits	$ 4,289,061
Regional Greenhouse Gas Initiative proceeds	$ 14,761,887
Total Revenues	$ 45,554,848
Expenditures:	
Administrative	$ 2,173,942
Residential programs:	
Program administration	$ 234,462
Low-income	$ 3,185,855
Non-low-income	$ 18,799,014
Business Programs:	
Program administration	$ 242,321
Small/medium	$ 11,022,661
Large	$ 8,671,504
Cross-cutting strategies:	
Program adinistration	$ 173,131
Education and awareness	$ 27,184
Alternative energy program	$ 146,749
Evaluation	$ 675,384
Other payments	$ 2,125,746
Total expenditures	$ 47,477,953
Deficiency of revenues under expenditures	$ (1,923,105)
Other financing uses:	
Intra-entity grants—state agencies	$ (380,411)
Net change in fund balance	$ (2,303,516)
Fund balance, beginning of year	$ 43,604,548
Fund balance, end of year	**$ 41,301,032**

Administration

In FY2016, Governor LePage appointed two new members to the Trust's Board of Trustees: Herbert Crosby, Professor Emeritus of Mechanical Engineering Technology at the University of Maine in Orono, and David Stapp, CEO/CTO of Peregrine Turbine Technologies in Wiscasset. These new members filled two vacancies on the Board and will each serve three-year terms. David Barber, Senior Consultant and Former President of Barber Foods, and Brent Boyles, former CEO of Maine Public Service, were also reappointed to the Board. All four members were recommended by the Maine State Legislature's Energy, Utilities, and Technology Committee and confirmed by the Senate in April. Finally, the Board elected the following officers in FY2016:

- David Barber, Chair
- Kenneth Fletcher, Vice Chair
- Brent Boyles, Treasurer
- Donald Lewis, Secretary

Other Initiatives

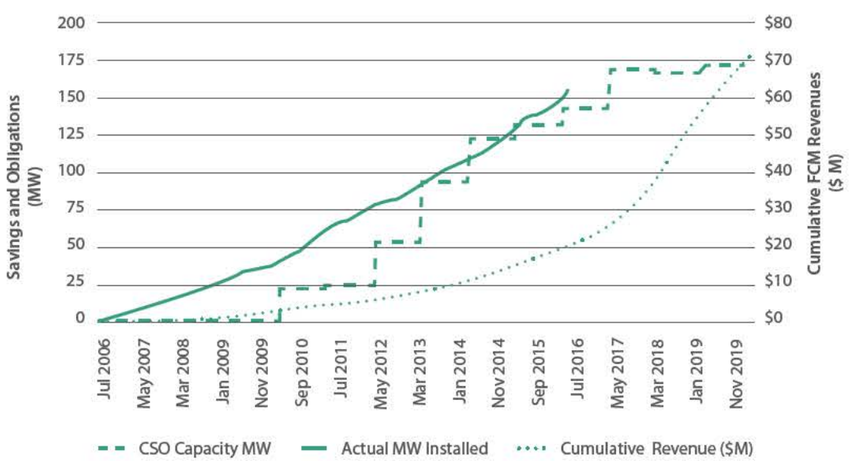
Independent System Operator for New England Forward Capacity Market

The Trust has participated in the Independent System Operator for New England (ISO-NE) Forward Capacity Market (FCM) since the market was launched in 2006. The FCM ensures that there is sufficient capacity in the ISO-NE region for reliable electric grid system operation. The Trust provides demand resources by helping develop energy efficiency and distributed generation projects in Maine that may be used to satisfy regional capacity needs. The Trust and other providers of demand resources offset the need for generation capacity during periods of peak demand, thus allowing transmission planners to meet a portion of forecasted capacity needs through demand resources instead of traditional central station generators. Each year, ISO-NE forecasts the size of the peak demand three years in the future and then holds an auction to procure the amount of capacity needed to meet the forecasted demand. In the auction, one megawatt of capacity demand reduction is given the same value as one megawatt of capacity supplied by a generator. As a market participant, the Trust is responsible for reporting on progress in meeting its existing capacity obligations from prior auctions and showing ISO-NE that the Trust's program results satisfy the ISO-NE measurement and verification protocols.

The Trust reported to ISO-NE on the increasing amount of capacity that the programs delivered to date every month of FY2016. All measures installed with the Trust's incentives are recorded in its project database. The database contains information about how often, and at what time of day, energy-efficient equipment is in operation, and aggregates these data for reporting to ISO-NE. To ensure the accuracy of this report, ISO-NE requires an annual independent certification to review the processes behind the Trust's monthly reports. All aspects of the Trust's tracking, verification, and reporting activities are reviewed and certified for compliance with the rigorous requirements of ISO-NE's measurement and verification manual.

In FY2016, the Trust pursued limited participation in the tenth Forward Capacity Auction (FCA). In the auction, the Trust took on an obligation to supply 18.3 MW of summer peak demand savings, for which it will be paid a price of $7.03 per kW per month. The Trust also made preparations for the eleventh FCA, which will be held in February 2017. To date, the Trust has delivered or taken obligations for a total of 172 MW of summer peak demand savings. As a result, the Trust's programs have lowered future energy prices for Mainers. Figure 1 summarizes the Trust's delivered savings and future obligations.

Figure 1: Summary of the Trust's FCA Actions



Regional Greenhouse Gas Initiative Reporting

Each year the Trust contributes to the Regional Greenhouse Gas Initiative (RGGI) Annual Report. The report is collaboratively prepared by the Department of Environmental Protection, the Public Utilities Commission (PUC), and the Trust. The report is submitted to standing committees of the Legislature having jurisdiction over natural resources and utilities and energy matters.

In the most recent RGGI Annual Report, the Trust described how it invested $15.5 million of RGGI funds in FY2015. The RGGI funds expended in that year are projected to result in annual savings of 27.9 million kWh, 80,005 MMBtu, and 20,704 tons of carbon dioxide. The report is available at the website of the Maine Department of Environmental Protection.

Low-Income Weatherization Assistance Program by the Maine State Housing Authority

The statute requires that the Trust include in the Annual Report:

> Total funds received and expended by the State on energy efficiency and weatherization pursuant to the Weatherization Assistance for Low-income Persons Program of the United States Department of Energy and the Low-income Home Energy Assistance Program of the United States Department of Health and Human Services.[24]

In Maine, these federally funded efficiency and weatherization initiatives are administered by the Maine State Housing Authority (MaineHousing). The budgets and expenses of these initiatives are summarized in the following table, which was prepared by MaineHousing.

Legislative Recommendations

The Trust's authorizing statute provides that the Annual Report should include "Any recommendations for changes to the laws relating to energy conservation."[25] The Trust has no recommendations for legislative changes at this time.

Table 25: MaineHousing Weatherization Initiatives

MaineHousing Maine State Housing Authority	Grant Year/Period		Production Budget	Production Expenses	Units	Comments
LIHEAP Weatherization						
Weatherization efforts to maximize energy savingsand reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to Community Action Agencies (CAAs), then paid directly to contractor for services; per unit average max of $7,105.	2013	10/01/12-09/30/13	$2,856,469	$2,091,682	266	Production Complete
	2014	10/01/13-11/30/14	$3,965,811	$3,383,916	436	Production Complete Contract extended to 11/30/2014
	2015	10/01/14-03/31/17	$5,429,695	$4,241,642	486 Projected	Production in Process Contract extended to 03/31/2017
	2016	10/01/15-03/31/18	$5,352,682	$1,188,213	686 Projected	Production in Process Contract extended to 03/31/2018
	2017	10/01/16-09/30/17	TBD	TBD	TBD	Funding not yet announced
Department of Energy/WX						
Weatherization efforts to maximize energy savings and reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to CAAs and then paid directly to contractor for services; per unit average max $7,105.	2012	04/01/12-06/30/13	$1,998,648	$1,901,076	283	Production Complete Grant period extended to continue production through 06/30/2013
	2013/2014	04/01/13-03/31/15	$2,637,114	$1,344,984	200	Production Complete Grant for 2013 and 2014 combined by DOE $1.3 million in funding carried over to PY 2015
	2015	04/01/15-03/31/16	$3,462,618	$2,777,390	367	Production Complete
	2016	04/01/16-03/31/17	$2,970,695	$241,140	105 Projected	Production in Process
Weatherization Supplemental						
Weatherization efforts to maximize energy savings and reduce fuel burden; minimal health/safety per unit of $800 and minimal incidental repairs (15% of weatherization costs) to make installation of weatherization materials effective; funds allocated to CAAs and then paid directly to contractor for services; per unit average max $6,769.	2013	01/01/13-12/31/13	$909,117	$870,875	172	Production Complete Funded by MaineHousing
	2014	01/01/14-12/31/14	$1,174,186	$1,062,803	175	Production Complete Funded by MaineHousing

prepared by gls/MH 09-08-2016

24 35-A MRS §10104(5)(B)(4). **25** Title 35-A, Maine Revised Statutes, §10104(4).

Appendices

APPENDIX A

Table 26 and Table 27 illustrate the total energy savings[26] and lifetime avoided energy costs associated with each of the programs administered by the Trust in FY2016. Each table also shows the summary of the Trust's costs. These figures include the financial incentives given to customers ("participants") and the participants' cost-share to install energy upgrades. The costs also include the Trust's efforts to manage the programs; provide public information and outreach; hold training sessions and provide technical support; and conduct quality control, measurement and verification, and evaluation of each program. The benefit-to-cost ratio indicates the ratio of the financial benefits (from the lifetime avoided energy costs) to the combined costs of the Trust and the participants.

Two different cost tests are used to assess a program's cost-effectiveness, one from the perspective of all utility customers (the Total Resource Cost [TRC] test) and one from the perspective of the program administrator (the Program Administrator Cost Test [PACT]). The criteria for the two cost tests are defined below.[27]

Table 26: FY2016 Program Impacts: Electric Programs

Program	Annual kWh Savings	Lifetime kWh Savings	Efficiency Maine Costs	Participant Costs	Lifetime Energy Benefit	Cost/kWh (Lifetime)	Benefit-to-Cost Ratio
Business Incentive Program Electric Measures	20,961,707	287,282,615	$7,028,734	$7,132,263	$27,557,961	$0.049	1.95
Large Custom Program Electric Measures	102,985,781	1,366,173,818	$6,597,108	$16,001,516	$73,570,796	$0.017	3.26
Small Business Initiative	1,237,832	16,091,810	$872,298	$712,066	$2,475,285	$0.098	1.56
Consumer Products Program	56,911,672	525,809,890	$12,895,561	$29,953,540	$111,696,259	$0.081	2.61
Home Energy Savings Program Electric Measures	9,249,035	166,482,630	$2,837,287	$888,660	$15,742,826	$0.022	4.23
Low-Income Direct Install Initiative Electic Measures	178,937	1,647,776	$137,634	$253	$163,769	$0.084	1.19
Arrearage Management Program	63,011	717,348	$115,669	$8,984	$112,396	$0.174	0.90
Strategic Initiatives—Electric			$762,878				
Administration—Electric			$2,123,597				
Total	**191,587,975**	**2,364,205,887**	**$33,370,766**	**$54,697,281**	**$231,319,292**	**$0.037**	**2.63**

26 Savings values reported in the program summary tables and individual program tables are "adjusted gross savings," unless otherwise indicated. Adjusted gross savings is the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted by factors developed through program evaluations. Periodically, Efficiency Maine enlists independent third-party contractors to evaluate the savings impacts of major programs. The evaluations develop factors to improve the accuracy of gross savings calculations based on installation rates and in situ-verified savings rates. The evaluations also analyze program attribution, including identifying program participants who would have installed the same or equivalent efficiency measures on their own even if the program had not been offered ("free-ridership") and the percentage of efficient equipment installed due to program influences even though no incentive or technical assistance was received ("spillover"). Factoring in free-ridership and spillover delivers "net savings," which quantifies the savings directly (adjusted gross – free-ridership) and indirectly (spillover) attributable to the program. Efficiency Maine publishes estimated free-ridership and spillover factors in the Technical Reference Manuals. **27** TRC and PACT are defined in accordance with "Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers, A Resource of The National Action Plan for Energy Efficiency," November 2008, http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf.

TRC test: Perspective of all utility customers (participants and nonparticipants)

This test compares program administrator plus customer costs to utility resource savings. The TRC test measures the benefits of the energy efficiency program for the service territory/region as a whole. Costs included in the TRC test are costs to purchase and install the energy efficiency measure, including the costs incurred by program participants and the costs of running the energy efficiency program. The benefits included are the avoided costs of energy.

PACT: Perspective of utility, government agency, or third party implementing the program

This test compares program administrator (the Trust) costs to supply-side resource savings. A positive PACT (greater than 1) indicates that an energy efficiency program is a lower-cost approach to meeting load growth than a wholesale energy purchase and new generation resources (including delivery and system costs). The PACT includes only costs incurred by the program administrator and not customer contributions.

Table 27: FY2016 Program Impacts: Thermal Program

Program	Annual MMBtu Savings	Lifetime MMBtu Savings	Efficiency Maine Costs	Participant Costs	Lifetime Energy Benefit	Cost/MMBtu (Lifetime)	Benefit-to-Cost Ratio
Business Incentive Program Natural Gas Measures	64,484	1,129,729	$679,429	$ 915,337	$7,744,009	$1.41	4.86
Home Energy Savings Program Natural Gas Measures	5,356	124,424	$260,019	$ 1,074,794	$2,027,715	$10.73	1.52
Low-Income Direct Install Initiative Natural Gas Measures	791	12,990	$74,500	$ 0	$97,931	$5.73	1.31
Business Incentive Program Other Fuels Measures	24,013	418,180	$1,648,560	$ 2,979,440	$7,218,858	$11.07	1.56
Large Custom Program Thermal Measures	90,749	1,203,839	$1,879,472	$ 4,132,517	$19,000,234	$4.99	3.16
Maine Advanced Building Program	623	12,462	$134,136	$ 59,514	$186,173	$15.54	0.96
Home Energy Savings Program Other Fuels Measures	79,878	1,855,554	$4,096,936	$ 16,028,541	$30,239,569	$10.85	1.50
Low-Income Direct Install Initiative Other Fuels Measures	6,058	109,041	$699,988	$ 975,580	$2,454,693	$15.37	1.46
Low-Income Home Energy Savings Program	502	10,101	$52,094	$ 41,735	$148,703	$9.29	1.58
Renewable Energy Demonstration Grants Program			$146,749				
Strategic Initiatives—Thermal			$48,025				
Administration—Thermal			$584,881				
Total	**272,452**	**4,876,321**	**$10,304,789**	**$26,207,457**	**$69,117,886**	**$7.49**	**1.89**

APPENDIX A

Table 28: Benefit-to-Cost Ratios—Electric Programs

Program	Adjusted Gross Benefit-to-Cost Ratio		Last Evaluation	Net-to-Gross Ratio	Net Benefit-to-Cost Ratio	
	TRC	PACT			TRC	PACT
Business Incentive Program Electric Measures	1.95	3.92	Note 2	0.72	1.63	2.83
Large Custom Program Electric Measures	3.26	11.15	Note 2	0.78	3.01	8.70
Small Business Initiative	1.56	2.84	Note 1	0.72	1.24	2.05
Consumer Products Program	2.61	8.66	2015	0.78	2.39	6.74
Home Energy Savings Program Electric Measures	4.23	5.55	Note 4	1.00	4.23	5.55
Low-Income Direct Install Initiative Electic Measures	1.19	1.19	Note 3	1.00	1.19	1.19
Arrearage Management Program	0.90	0.97	Note 3	1.00	0.90	0.97
Total	**2.63**	**6.93**		**0.79**	**2.38**	**5.45**

Table 29: Benefit-to-Cost Ratios—Thermal Programs

Program	Adjusted Gross Benefit-to-Cost Ratio		Last Evaluation	Net-to-Gross Ratio	Net Benefit-to-Cost Ratio	
	TRC	PACT			TRC	PACT
Business Incentive Program Natural Gas Measures	4.86	11.40	Note 3	0.66	4.01	7.55
Home Energy Savings Program Natural Gas Measures	1.52	7.80	2011	1.00	1.52	7.80
Low-Income Direct Install Initiative Natural Gas Measures	1.31	1.31	2014	1.00	1.31	1.31
Business Incentive Program Other Fuels Measures	1.56	4.38	Note 2	0.91	1.48	4.00
Large Custom Program Thermal Measures	3.16	10.11	Note 2	0.78	2.90	7.89
Maine Advanced Building Program	0.96	1.39	Note 3	1.00	0.96	1.39
Home Energy Savings Program Other Fuels Measures	1.50	7.38	Note 4	1.00	1.50	7.38
Low-Income Direct Install Initiative Other Fuels Measures	1.46	3.51	Note 1	1.00	1.46	3.51
Low-Income Home Energy Savings Program	1.58	2.85	Note 4	1.00	1.58	2.85
Total	**1.89**	**6.71**		**0.89**	**1.79**	**6.38**

Note 1 New program, not yet evaluated. Program evaluation currently being planned.

Note 2 Currently being evaluated. Results to be published in 2017.

Note 3 Evaluation not scheduled.

Note 4 Evaluation to begin in 2017. Results to be published in 2018.

APPENDIX B

Table 30: Electric Program Expenditures

Program	Incentive	Delivery	Total
Business Incentive Program Electric Measures	$ 6,736,098	$ 292,636	$ 7,028,734
Large Custom Program Electric Measures	$ 6,137,444	$ 459,664	$ 6,597,108
Small Business Initiative	$ 780,735	$ 91,563	$ 872,298
Consumer Products Program	$ 10,902,261	$ 1,993,299	$ 12,895,561
Home Energy Savings Program Electric Measures	$ 2,439,500	$ 397,787	$ 2,837,287
Low-Income Direct Install Initiative Electic Measures	$ 131,103	$ 6,531	$ 137,634
Arrearage Management Program	$ 31,512	$ 84,157	$ 115,669
Strategic Initiatives—Electric	-	-	$ 762,878
Administration—Electric	-	-	$ 2,123,597
Total	**$ 27,158,653**	**$ 3,325,638**	**$ 33,370,766**

Table 31: Thermal Program Expenditures

Program	Incentive	Delivery	Total
Business Incentive Program Natural Gas Measures	$ 550,067	$ 129,362	$ 679,429
Home Energy Savings Program Natural Gas Measures	$ 219,783	$ 40,236	$ 260,019
Low-Income Direct Install Initiative Natural Gas Measures	$ 23,457	$ 51,043	$ 74,500
Business Incentive Program Other Fuels Measures	$ 1,214,817	$ 433,744	$ 1,648,560
Large Custom Program Thermal Measures	$ 1,585,043	$ 294,429	$ 1,879,472
Maine Advanced Building Program	$ 63,700	$ 70,436	$ 134,136
Home Energy Savings Program Other Fuels Measures	$ 3,277,659	$ 819,277	$ 4,096,936
Low-Income Direct Install Initiative Other Fuels Measures	$ 512,005	$ 187,983	$ 699,988
Low-Income Home Energy Savings Program	$ 33,500	$ 18,594	$ 52,094
Renewable Energy Demonstration Grants Program	$ 146,749	$ 0	$ 146,749
Strategic Initiatives—Thermal	–	–	$ 48,025
Administration—Thermal	–	–	$ 584,881
Total	**$ 7,626,780**	**$ 2,045,104**	**$ 10,304,789**

APPENDIX C

Table 32: Efficiency Maine Trust FY2017 Amended Budget as of 9/21/2016

	EMT Admin Fund	RGGI	Electric Procurement	MPRP	MYSF	FCM	Natural Gas Procurement	Renewable Resource Fund	LTC	Revolving Loan Funds	FY2017 Total Budget
Total Revenues & Use of Fund Balance	1,382,466	18,735,192	36,656,623	3,207,586	913,725	7,869,282	3,998,574	215,435	1,316,214	664,500	**74,959,597**
Expenditures											
Low-Income Initiatives	-	685,885	3,945,305	1,348,265	1,116	-	469,063	-	-	-	**6,449,634**
Consumer Products Program	-	-	8,992,318	289,119	30,127	2,421,800	-	-	-	-	**11,733,364**
Home Energy Savings Program	-	3,682,671	5,439,328	35,162	94,567	50,985	703,730	-	-	361,000	**10,367,443**
Home Energy Savings Program	-	3,382,671	5,439,328	35,162	94,567	50,985	703,730	-	-	-	**9,706,443**
Revolving Loan Support	-	-	-	-	-	-	-	-	-	361,000	**361,000**
Loan Loss Reserve	-	300,000	-	-	-	-	-	-	-	-	**300,000**
C&I Prescriptive Program	-	1,533,003	6,430,825	377,174	-	2,021,936	2,065,720	-	-	-	**12,428,658**
C&I Custom Program	-	6,901,650	5,598,383	977,866	787,915	2,487,921	238,139	-	1,316,214	-	**18,308,088**
Commercial Small Business	-	-	2,203,926	-	-	-	-	-	-	6,000	**2,209,926**
Commercial Small Business	-	-	2,203,926	-	-	-	-	-	-	-	**2,203,926**
Commercial Loan Support	-	-	-	-	-	-	-	-	-	6,000	**6,000**
Commercial New Construction/MAB	-	1,568,905	410,755	-	-	-	266,560	-	-	-	**2,246,220**
Renewable Energy Demonstration	-	-	-	-	-	-	-	197,435	-	-	**197,435**
Innovation	-	103,926	382,315	15,000	-	304,067	21,280	-	-	-	**826,588**
Public Information	42,826	41,000	171,102	7,500	-	25,000	10,640	-	-	-	**298,068**
EM&V	-	205,000	730,511	37,500	-	125,000	53,201	-	-	-	**1,151,212**
Administration	1,324,640	800,000	2,059,652	105,001	-	382,573	148,963	-	-	43,096	**4,863,925**
Inter-Agency Transfers	15,000	3,213,152	292,204	15,000	-	50,000	21,280	18,000	-	-	**3,624,636**
Public Utilities Commission	-	82,000	292,204	15,000	-	50,000	21,280	-	-	-	**460,484**
RGGI Rate Relief	-	3,000,000	-	-	-	-	-	-	-	-	**3,000,000**
RGGI Inc Operating Costs	-	76,586	-	-	-	-	-	-	-	-	**76,586**
Department of Enviornmental Protection	-	54,566	-	-	-	-	-	-	-	-	**54,566**
Governor's Energy Office	15,000	-	-	-	-	-	-	-	-	-	**15,000**
DECD (Maine Technology Institute)	-	-	-	-	-	-	-	18,000	-	-	**18,000**
Total Expenditures	1,382,466	18,735,192	36,656,624	3,207,587	913,725	7,869,282	3,998,576	215,435	1,316,214	410,096	**74,705,197**
Reserved Fund Balance	116,460	1,264,703	490,000	-	-	320,000	189,000	-	-	-	**2,380,163**

APPENDIX D

Table 33: FY2016 Public Utilities Commission Assessments and Revenue Collections

Electric Efficiency Procurement					
Procurement Quarter:	July-Sep 2015	Oct-Dec 2015	Jan-Mar 2016	Apr-Jun 2016	
Billing Date:	1-Jul-15	1-Oct-15	1-Jan-16	1-Apr-16	
Name					Total—FY2016
Central Maine Power Co	$ 3,638,613.00	$ 3,638,613.00	$ 3,638,613.00	$ 3,638,613.00	$ 14,554,452.00
Eastern Maine Electric Coop	$ 44,989.85	$ 44,989.85	$ 44,989.85	$ 44,989.84	$ 179,959.39
Emera (Bangor Hydro/MPS)	$ 839,420.55	$ 839,420.55	$ 839,420.54	$ 839,420.54	$ 3,357,682.18
Fox Island Electric Coop	$ 4,675.07	$ 4,675.07	$ 4,675.07	$ 4,675.07	$ 18,700.28
Houlton Water Co	$ 32,553.10	$ 32,553.10	$ 32,553.10	$ 32,553.08	$ 130,212.38
Kennebunk Light & Power	$ 51,155.62	$ 51,155.62	$ 51,155.62	$ 51,155.62	$ 204,622.48
Madison Electric Works	$ 11,796.42	$ 11,796.42	$ 11,796.42	$ 11,796.42	$ 47,185.68
Swan's Island Electric	$ 1,000.75	$ 1,000.75	$ 1,000.75	$ 1,000.75	$ 4,003.00
Van Buren Light & Power Co	$ 795.67	$ 795.67	$ 795.67	$ 795.65	$ 3,182.66
Totals	**$ 4,625,000.03**	**$ 4,625,000.03**	**$ 4,625,000.02**	**$ 4,624,999.97**	**$ 18,500,000.05**

State Budget Projections	FY2016	FY2017
Central Maine Power Co	$ 14,554,452	$ 25,388,621
Eastern Maine Electric Coop	$ 179,959	$ 312,695
Emera (Bangor Hydro/MPS)	$ 3,357,682	$ 5,847,870
Fox Island Electric Coop	$ 18,700	$ 33,087
Houlton Water Co	$ 130,212	$ 229,741
Kennebunk Light & Power	$ 204,622	$ 355,320
Madison Electric Works	$ 47,185	$ 85,167
Swan's Island Electric	$ 4,002	$ 6,897
Van Buren Light & Power Co	$ 3,182	$ 47,498

Natural Gas Efficiency Procurement					
Procurement Quarter:	July-Sep 2015*	Oct-Dec 2015	Jan-Mar 2016	Apr-Jun 2016	
Billing Date:	30-Sep-15	31-Dec-15	31-Mar-16	30-Jun-16	
Name					Total—FY2016
Northern Utilities—Unitil	$ 499,262.18	$ 290,829.89	$ 290,829.89	$ 290,829.89	$ 1,371,751.85
Bangor Natural Gas	$ 274,915.78	$ 73,039.28	$ 73,039.28	$ 73,039.28	$ 494,033.62
Maine Natural Gas	$ 200,505.41	$ 49,852.06	$ 49,852.06	$ 49,852.06	$ 350,061.59
Summit Natural Gas	$ 10,401.28	$ 10,401.28	$ 10,401.28	$ 10,401.28	$ 41,605.12
Totals	**$ 985,084.65**	**$ 424,122.51**	**$ 424,122.51**	**$ 424,122.51**	**$ 2,257,452.18**

State Budget Projections	FY2016**	FY2017
Northern Utilities—Unitil	$ 1,163,320	$ 1,632,635
Bangor Natural Gas	$ 494,033	$ 409,946
Maine Natural Gas	$ 350,062	$ 281,245
Summit Natural Gas	$ 41,605	$ 59,581

Alternative Compliance Mechanism (AMC)					
Assessment Quarter:	July '15-Jun '16*				
Billing Date:	30-Sep-15				
Name					Total—FY2016
Mega Energy Holdings, LLC	$ 198.48	$ -	$ -	$ -	$ 198.48
Totals	**$ 198.48**	**$ -**	**$ -**	**$ -**	**$ 198.48**

*Includes Q4 FY2015 assessments received during FY2016 and arrearages ordered paid by Bangor Natural Gas and Maine Natural Gas
** Includes FY2016 natural gas assessments and arrearages ordered paid by Bangor Natural Gas and Maine Natural Gas

Glossary

Adjusted Gross Savings: The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an Efficiency Maine program, regardless of why they participated, adjusted for installation rates and savings rates verified through program evaluations.

Affected Customer: One of the 16 energy-intensive manufacturers in Maine who receive a portion of the state's Regional Greenhouse Gas Initiative (RGGI) revenues in the form of a disbursement. These businesses were identified by the Maine Public Utilities Commission in an Order issued on October 21, 2016, in Docket No. 2016-00143.

Arrearage: Unpaid debt or overdue payments

Avoided Energy Supply Costs: Costs that would have incurred had a utility and/or energy supplier otherwise been required to supply the power that was avoided through the installation of an energy efficiency or distributed generation project. The avoided costs include the wholesale cost of energy and capacity, the embedded costs of complying with renewable energy and climate policies, plus the marginal costs of adding future transmission and distribution (but not the retail cost of transmission and distribution).

Benefit-to-Cost Ratio: The ratio of the net present value of the quantifiable financial benefits (from the lifetime avoided energy costs) to the costs of an efficiency measure. The benefits and costs included in the calculation are dependent on what test is being used. See definitions of Program Administrator Cost and Total Resource Cost.

Community Action Agency (CAA): Nonprofit private and public organizations established under the U.S. Economic Opportunity Act of 1964 to reduce poverty. CAAs deliver emergency services, education, training, housing, weatherization services, and more.

Demand Response: A change in electric usage by end-use customers in response to changes in the price of electricity or an incentive to reduce usage when called upon.

Design-Build Approach: An approach to construction that bundles design and construction services under one contract.

Federal Energy Regulatory Commission (FERC): The federal agency that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce, interstate pipelines, storage projects, and more.

Free-Rider: A program participant who, in the determination of third-party evaluators, would have installed equivalent efficiency measures independent of the Trust's program or its incentives.

Lifetime Energy Benefit: The net present value of the avoided energy supply cost of energy and demand savings over the measure life.

Maximum Achievable Cost-Effective (MACE): An energy efficiency industry term that refers to the full universe of potential cost-effective energy efficiency projects that could realistically be installed given technical and economic constraints and assumed adoption rates based on offered incentives.

Measure Life: The length of time that a measure is expected to be functional. Measure Life is a function of: (1) equipment life—meaning the number of years that a measure is installed and will operate until failure; and (2) measure persistence which takes into account business turnover, early retirement of installed equipment, and other reasons that measures might be removed or discontinued. Measure Life is sometimes referred to as expected useful life (EUL).

Modified Participant Cost Test (MPCT): This cost-effectiveness test, applied by the Trust only to certain renewable energy projects, compares the participant's costs after application of any rebate or tax incentives to the lifetime electricity/fuel savings based on the retail prices in place at the time of project commencement. A positive MPCT (greater than 1.0) indicates that lifetime benefit achieved by a renewable energy project is lower than the funds invested by the customer.

Net Position: An accounting term referring to the variance between assets and liabilities.

APPENDIX E

Net Savings: Net savings estimate the amount of adjusted gross savings that can be directly and indirectly attributed to a program based on program participants' motivation. Participants who, in the determination of the evaluators, would have installed equivalent efficiency measures independent of the program and its incentives are considered "free-riders." To calculate net savings, the impacts of savings attributed to free-riders are excluded. By contrast, savings realized by program participants through the installation of additional efficiency measures due to program influences, even though no incentive or technical assistance was received (called "spillover") are added.

Net-to-Gross (NTG) Ratio: The ratio of net savings to adjusted gross savings. The NTG is defined as 1 minus the free ridership (FR) rate plus the spillover (SO) rate (NTG=1-FR+SO).

PowerSaver Loan: An energy efficiency and renewable energy loan offered through the Federal Housing Administration.

Prescriptive Approach: This program design approach offers fixed-price financial incentives for a predefined list of "off-the-shelf," widely available measures.

Program Administrator Cost Test (PACT): This cost-effectiveness test compares Efficiency Maine Trust's costs to supply-side resource savings. A positive PAC test (greater than 1.0) indicates that an energy efficiency program is a lower-cost approach to meeting load growth than a wholesale energy purchase and new generation resources (including delivery and system costs). The PAC test includes only costs incurred by the program administrator and not customer contributions.

Qualified Partner: A term used to describe the network of contractors and vendors working with Efficiency Maine's Business Incentive Program.

Spillover: Savings realized by program participants through the installation of additional efficiency measures due to program influences, even though no incentive or technical assistance was received.

Total Resource Cost (TRC) Test: This cost-effectiveness test captures the perspective of all utility customers, participants and non-participants. It is the comparison of program administrator and customer costs to utility resource savings. The TRC test measures the benefits of the energy efficiency program for the service territory/region as a whole. Costs included in the TRC test are costs to purchase and install the energy efficiency measure, including the costs incurred by program participants and the costs of running the energy efficiency program. The benefits included are the avoided energy supply cost.

Value-Line LED: A term used to describe LED bulbs that are as efficient as ENERGY STAR® models but do not meet all ENERGY STAR® certification requirements (e.g., having a shorter bulb life).

FY2016 BY THE NUMBERS

$80,904,739
Private dollars leveraged for 2016 projects

$43,675,555
Invested by Efficiency Maine in 2016

Total amount loaned for home energy projects:
$4.2 million
500 total loans

$29,519,253
In annual lower energy bills for participating homes and businesses

The equivalent of
35,081,446
gallons of oil will be avoided because of thermal energy efficiency projects installed in 2016

Annual avoided GHG emissions in 2016
118,977
tons CO_2

In 2016, Mainers saved enough electricity to power
31,183 homes

That's roughly all the homes in Lewiston-Auburn!

Efficiency projects in Maine installed since 2006 delivered the equivalent of a **157 MW** power plant operating on the hottest day of the summer in 2016

efficiency MAINE =

accounting for 7% of Maine's generating capacity during summer peak.

Jobs created from 2016 investments
406

Total number of energy-saving projects installed in businesses:
3,707

1,208 businesses in our network of contractors and other energy efficiency professionals

3,763
Air sealing and insulation projects

2,744
Heat pump water heaters installed

5,981
Heat pumps installed

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